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DISEASES CAUSED BY BACTERIA AND FUNGI

DAVISON, M. M., DEROW, M.A., & WALKER, B. S. (1949.) **Staphylococcal hyaluronidase.**—*J. Bact.* **58.** 717-722. [Authors' summary copied *verbatim*.] **1863**

Some strains of *Staphylococcus aureus* produce extracellular hyaluronidase when grown in a tryptic digest medium. The hyaluronidase-positive L strain apparently contains no intracellular hyaluronidase. The R mutant of the hyaluronidase-positive L strain fails to produce hyaluronidase. Hyaluronidase production is resumed upon reversion to the normal S form. Staphylococcal hyaluronidase can be concentrated and purified to some extent by precipitation at pH 3.0.

The present evidence may indicate the existence of more than one staphylococcal hyaluronidase, as suggested by Rogers (1948).

McFADDEN, L. J. & BOON, R. D. (1949.) **Beta-haemolytic streptococcal infection in dogs.**—*Aust. vet. J.* **25.** 231-239. **1864**

The presence in Australia of a syndrome of infertility, abortion, and neonatal deaths in breeding kennels is reported. History, clinical findings, pathological and bacteriological findings, and therapy are discussed.

Beta-haemolytic streptococci of the Lancefield Groups C and G were isolated from vaginal swabs, preputial swabs, maternal milk, and P.M. from dead puppies of affected bitches. No case of tonsillar infection was encountered. Treatment of infected bitches with penicillin preparations was effective in controlling the infection.—J. H. WHITEM.

HAMBURGER, M., Jr., & ROBERTSON, O. H. (1949.) **Expulsion of group A hemolytic**

streptococci in droplets and droplet nuclei by sneezing, coughing and talking.—*Amer. J. Med.* **4.** 690-701. [Abst. in *Bull. Hyg., Lond.* **24.** 796. (1949), copied *verbatim*. Signed: R. E. O. WILLIAMS.] **1865**

Estimates were made of the number of streptococci—both alpha-haemolytic and Group A beta-haemolytic—expelled into the air of an experimental room by a series of 48 carriers (in nose or throat or both) of Group A streptococci. Airborne bacteria, presumed to be in the form of "droplet nuclei," were collected by bubbler samplers at 1½, 5½ and 9½ feet from the seated carrier; and plates were exposed on the floor at the same points, to collect "large droplets" settling out of the air. [In making quantitative estimates of airborne bacteria for comparison with the number settling from the air, bubbler samplers are theoretically unsatisfactory, in that the number of colonies counted on the final plates is affected by the extent to which air-borne clusters are broken up in the broth. Samplers collecting directly on to solid media are more satisfactory.]

In sneezing, fair main patterns of dispersion of Group A streptococci were observed: 13 of the 20 subjects expelled moderate numbers in the form of large droplets which fell rapidly to the floor and were collected on the nearest plate, and only a few as droplet nuclei recovered in the bubbler samplers; 2 subjects expelled small numbers of streptococci in droplet nuclei and none as large droplets; one dispersed no streptococci; and one, who had unusually large numbers of streptococci in his saliva, dispersed large numbers both as droplet nuclei and in large droplets. By contrast, practically all

the 20 subjects expelled large numbers of alpha-haemolytic streptococci as large droplets, and seven expelled many as droplet nuclei; in the latter case the droplet nuclei remained air-borne for at least 10-16 minutes. "Baffling" a sneeze with the hand prevented the dispersal of the great majority of the streptococci. Very few streptococci were dispersed in either coughing or talking.

The authors stress the fact that the importance of a particular method of disposal of respiratory pathogens such as sneezing will depend on the concentration of the pathogen in the particular secretion that is dispersed, and on the mechanics and frequency of the dispersing activity. As far as beta-haemolytic streptococci are concerned, sneezing is relatively unimportant as a method of contaminating air with small droplets, because it is rare for large numbers of the streptococci to be present in saliva (the secretion that is expelled in the small droplets) and because sneezing is relatively rare in patients with streptococcal infections. Contamination of the clothing and so forth by way of the hands is probably much more important.

BUXTON, J. C. (1949.) **Bovine mastitis associated with beta-haemolytic Group C streptococci.**—*Brit. vet. J.* **105.** 107-114. **1866**

The bacteriology of strains of Group C streptococci [*Str. pyogenes* (animal) or *Str. zooepidemicus*], isolated from 25% of the 46 cows in one herd in England and from 64% of the 35 cows in another herd is described. The udder infections were heavy and co-existed with *Str. agalactiae* infection to give subacute to chronic mastitis. Infection in the first herd caused by *Str. agalactiae* was reduced by 80% with three daily infusions of 50,000 units of aqueous penicillin, but this did not affect the Group C streptococcus infection in which three such courses gave a slower response. In the second herd the response was more even following three daily infusions of 100,000 units to quarters evenly infected by the two groups of streptococci. —MALCOLM WOODBINE.

CARMICHAEL, J., MACLAY, M. H., JOHNSON, A. V., & JOHNSON, L. (1950.) **The treat-**

ment of penicillin resistant mastitis.—*Vet. Rec.* **62.** 55-58. [Authors' summary and conclusions copied *verbatim*.] **1867**

In vitro studies with dibromopropamide are described demonstrating (a) interference with the anti-bacterial activity of the compound by milk compared with peptone broth as a medium, and (b) a synergistic effect between this compound and sulphathiazole against *Staph. aureus* in milk.

A preparation containing 200 mg. dibromopropamide isethionate and 50 mg. sulphathiazole in 5 c.c. of an arachis oil-beeswax base has been used in the field by intramammary injection in treating a number of cows with udder infections (clinical and sub-clinical). These were occurring in herds where penicillin had been used as a routine treatment for some years.

Promising results were obtained in cases caused by *Staph. aureus* and *Str. uberis*, and the injections were well tolerated on the whole. In *Str. agalactiae* infections the treatment appeared to be effective but reactions to injection were rather more marked and frequent.

It is concluded that the preparation is worthy of further trial in penicillin-resistant mastitis.

BAZELEY, P. L., BALDWIN, S., DICKSON, H., & THAYER, J. R. (1949.) **The keeping qualities of strangles vaccine.**—*Aust. vet. J.* **25.** 130-133. **1868**

A serious deterioration in the protective antigen content of formolized strangles vaccine occurs during storage at room temperature. This has been demonstrated by mouse protection tests, and more delicately by precipitin titrations. Freeze-drying of the vaccine, which can be accomplished without loss of its protective antigens, is practicable.—J. H. WHITTEM.

LINDENSTRUTH, R. W., ASHCRAFT, J. B., & WARD, B. Q. (1949.) **Studies on vibronic abortion of sheep.**—*J. Amer. vet. med. Ass.* **114.** 204-205. **1869**

Flasks containing *Vibrio foetus* in hay, soil and sheep faeces respectively were kept at 37°, 20° and 6°C. and cultures were made every ten days. After 20 days' exposure it was recovered only from the

three flasks kept at 6°C., but not after 30 days.

Twenty pregnant ewes were divided into five groups of four. In Experiment 1, Group 1 were given contaminated hay and water for the first month of gestation; Group 2 were given this material for two months; Group 3 for three months; Group 4 for four months and Group 5 for the entire gestation. In Experiment 2, ewes in Group 1 were given two intraperitoneal injections of a suspension (each 10 ml.) during the first month of gestation; those in Groups 2, 3, 4 and 5 were given injections during the 2nd, 3rd, 4th and 5th months of pregnancy respectively. Abortions occurred in Groups 4 and 5 (experiment 1) and Groups 3 and 5 (experiment 2). No abortions occurred in the control group. The organism was recovered from all except one of the aborted fetuses.—L. G. DONALD.

WESSELS, C. C., & DE KOCK, J. A. (1947.) **An unusual outbreak of anthrax in cattle with special reference to treatment with penicillin.**—*J. S. Afr. vet. med. Ass.* 18. 163-164. 1870

Cattle on two farms in Natal developed anthrax after inoculation with *Anaplasma centrale* vaccine (infected blood). Among 114 animals on one farm 15 died within three days of vaccination and a further 27 died subsequently. It was concluded that the vaccine became contaminated locally, because large numbers of animals were inoculated with the same batch of vaccine in other parts of the country without untoward incident.

Injections of penicillin every eight hours for 72 hours, 100,000 units at the site of vaccination and 125,000 units in nut oil and beeswax intramuscularly, appeared to prevent deaths among affected animals on the second farm.—E. G. WHITE.

SUTTON, G. D. (1949.) **The use of gastric mucin in the examination of specimens for anthrax.**—*J. S. Afr. vet. med. Ass.* 20. 34-35. 1871

The addition of equal parts of 5% gastric mucin to saline extracts of material (bonemeal or skin) to be tested for the presence of *Bacillus anthracis* is of value, provided that putrefactive organisms are

not numerous. Of 32 samples of material examined by subcutaneous inoculation of g. pigs, 26 gave positive results both with the saline extract alone and with the addition of gastric mucin. In two samples *B. anthracis* was demonstrated only when mucin was added. In four cases the g. pigs inoculated with saline extract with added mucin died from the effects of putrefactive organisms, whereas those given the saline extract alone survived.—E. G. WHITE.

GUNN, F. D., & SHEEHY, J. J. (1950.) **Experimental tuberculosis in the dog. Comparison of lesions in puppies and in mature dogs.**—*Amer. Rev. Tuberc.* 61. 77-94. [Spanish summary; English summary slightly modified.] 1872

In a comparison of susceptibility to tuberculosis in puppies, one and one-half to three months old, and five to eight months old, and in mature dogs, no significant differences were found in mortality rate when comparable doses of virulent tubercle bacilli were administered by the intrabronchial route. Likewise no significant differences in susceptibility were observed when the mortality from tuberculosis in the puppies of both age groups was compared with the mortality of mature dogs.

The size of the pulmonary lesions and their form and cellular composition in the early stages of development were essentially the same in the dogs of all the ages.

Cavity formation at the site of the primary pulmonary lesions was about twice as frequent in mature dogs as in either of the groups of puppies.

The incidence and extent of caseation of primary foci and of tracheo-bronchial lymph nodes did not differ significantly in a comparison of puppies and adult dogs. The maximal extent of caseation in the primary complex in all three age groups was reached within a period of forty to ninety days after the time of infection.

Calcification of the tuberculous lesions of the lungs was much more frequent in the younger (66.6 per cent) than in the older puppies (25 per cent) or in the mature dogs (3.8 per cent). There was no correlation between the frequency and extent of caseation and the incidence of calcification

for reasons discussed. A similar difference in incidence of calcification of caseous lesions of lymph nodes was observed when lesions of dogs in the three age groups were compared.

The presence of epithelioid cell tubercles in the liver, spleen, and kidneys during the stage of active progression of pulmonary infections was about twice as frequent in puppies of the older age group and in adult dogs as in the younger puppies. These lesions are considered to represent the effects of transient bacteremia, usually disappearing without trace as the central lesion becomes arrested, or of a terminal bacteremia. As was to be expected, the incidence of hematogenous lesions was greater in those dogs which died of progressive tuberculosis than in those which were sacrificed during various stages of development and regression of their pulmonary lesions. The incidence of hematogenous lesions showed no correlation with the mortality rate, however, when a comparison was made between the animals of the three age groups.

DUBOS, R. J., FENNER, F., & PIERCE, C. H. (1950.) **Properties of a culture of BCG grown in liquid media containing Tween 80 and the filtrate of heated serum.**—*Amer. Rev. Tuberc.* **61**. 66-76. [Spanish summary; English summary copied *verbatim*.] 1873

A simple technique is described for the preparation from human and animal sera heated at acid reactions of a filtrate which can replace the albumin fraction for the cultivation of tubercle bacilli.

Cultures of BCG grow rapidly and diffusely in a liquid medium containing this crude albumin fraction of human serum and a small amount of the wetting agent Tween 80. The cultures obtained under these conditions consist predominantly of cells which are viable and physiologically active. Quantitative colonial counts reveal that the bacilli retain their viability for prolonged periods of time under ordinary conditions of refrigeration and even at 37°C. Cultures of BCG grown diffusely in media containing Tween 80 and the filtrate of heated

human serum retain unaltered their characteristic degree of attenuated virulence and their ability to elicit in guinea pigs both tuberculin allergy and an increased resistance to subcutaneous infection with virulent human tubercle bacilli.

It is possible to sensitize guinea pigs with very minute amounts of dispersed culture (0.000001 c.c.) containing only a few viable units. The homogeneity and stability of the cultures, even after prolonged periods of storage, greatly facilitate the operations required for the preparation, distribution, and biological control of the vaccine.

YOUNG, J. A., & PATERSON, J. S. (1949.) **Studies on the vaccination of cattle as a measure against infection with tuberculosis with the living vole acid-fast bacillus.**—*J. Hyg., Camb.* **47**. 39-78. 1874

In a series of experiments 7-day-old cultures on unglycerinated Dorset's egg medium of the vole acid-fast bacillus were used. Two strains were used and inoculation was by the intravenous route except in a few cases in which other routes were tried. Resistance was tested by oral administration of 7.5 mg. of virulent bovine organisms.

A single intravenous inoculation of 5 mg. of vole bacilli raises resistance considerably, but the resistance takes time to develop and is of insufficient duration for use in the field. Revaccination, provided it is delayed until the end of the fourth week, intensifies resistance, but it is not yet known whether it also lengthens the duration of resistance.

The degree of resistance set up in cattle is correlated with the virulence of the bacillus for the vole, its natural host. One strain, G 564, set up fatal infection in calves.

A severe transient lameness following inoculation affected a proportion of the animals and the joint lesions which were found in such cases are described; they resembled those which have been described in joints in serum sickness, allergy and anaphylaxis.—M.C.

MORIN, J. (1947.) Influence des sous-sols et des sols sur l'ostéomatologie et la

paratuberculose dans les Deux-Sèvres. [The influence of the soil on the incidence of osteomalacia and Johne's disease in Deux-Sèvres, France].—Thesis, Alfort. pp. 69. 1875

The geology and systems of agriculture of that part of France known as the Département des Deux-Sèvres are first described. There is great diversity of soils and sub-soils in this area.

Osteomalacia affecting particularly dairy cows is well known in certain areas. In Sainte-Soline, for example, it is stated that milch cows cannot be kept for longer than one year; at the end of that time they have lost condition and have a marked pica and must be sent to pasture on adjoining high lands where the symptoms disappear. The symptoms in fully developed cases are lameness, tendency to spend much time lying down, decreased appetite, pica and loss of condition. The lesions include infiltration of sero-sanguineous fluid into and between the muscles of the shoulder, fore-legs and thighs, rupture of tendons and thickening and softening of bones. The incidence is related to soils which are poor in phosphoric acid and also deficient in lime.

Johne's disease has been well known in France for a long time, but in the Département des Deux-Sèvres it became a problem only after the 1914-18 war when infection is said to have been introduced by cattle brought from Normandy and Cantal. The incidence was studied between 1930-35 by Sasseau and it was found to be most common in the Bocage, Gâtine, and Melle districts, at that time there were between 400 and 500 cases each year. The incidence is highest on acid soils, poor in calcium and badly drained; on chalk soils the disease is rare. M. concludes that in the Département des Deux-Sèvres osteomalacia and Johne's disease occur in the same areas and that an important factor in the ecology of both diseases is the nature of the soil and the subsoil. Lack of phosphoric acid is the main factor in causation of osteomalacia, but in some cases deficiency of lime prevents the utilization of phosphoric acid by the vegetation. Deficiency of phosphoric acid in the soil has no direct effect on the Johne's disease organism, but

cattle on such deficient soils are rendered more susceptible to attack by the organism. —M.C.

FRANCIS, J., MADINAVEITIA, J., MACTURK, H. M., & SNOW, G. A. (1949).—Isolation from acid-fast bacteria of a growth factor for *Mycobacterium johnei* and of a precursor of phthiocol. [Correspondence.] —Nature, Lond. 163. 365-366. 1876

The authors isolated from *Mycobact. phlei* a compound capable of promoting vigorous growth of *M. johnei* on egg medium. This growth factor was a crystalline colourless aluminium derivative.

The authors also isolated from *M. tuberculosis* as a yellow oil a substance resembling the known K vitamins and incapable of promoting growth of *M. johnei*. This oil yields phthiocol on alkaline hydrolysis. It appears to be the source of the phthiocol isolated from extracts of *M. tuberculosis* by R. J. Anderson and M. S. Newman, J. Biol. Chem. (1933), 101. 773.

—W. R. BETT.

COHEN, S. (1949.) Stimulation of the growth of a strain of *Corynebacterium diphtheriae* by polyvinyl alcohol. —J. Bact. 58. 783-790. [Author's summary copied verbatim.] 1877

Polyvinyl alcohol, a synthetic, water-soluble polymer, was found to stimulate the growth, in a synthetic medium, of small inocula of a *gravis* strain of *Corynebacterium diphtheriae*.

VORACEK, F. (1949.) O výsledcích intravenosního vstříknutí malleinu vozhrivým koním. [The effect of intravenous injections of mallein on horses affected with glanders.] —Cas. ceskoslovensk. Vet. 4. 273-276. [English and Russian summaries.] 1878

The author recalls his experiences as an army veterinarian during the 1914-18 war in Styria. In a series of experiments carried out in 1916 he used four horses which had yielded positive mallein eye reactions only after repeated tests, made at intervals of three weeks. Intravenous doses of 1.5 ml. of mallein in 1.5 ml. of physiological saline produced fatal anaphylactic shock. Doses of 1ml. in 1ml. saline and 1.5 ml. in 2ml. saline, although

not fatal, produced severe anaphylactic symptoms such as dyspnoea, sensorial defects, general weakness and loss of balance.

The author suggests the use of intravenous injections of mallein as a quick diagnostic method, particularly in cases of long standing with doubtful allergic and serological tests.—E.G.

CRAVITZ, L., & MILLER, W. R. (1950.)
Immunologic studies with *Malleomyces mallei* and *Malleomyces pseudomallei*. I. Serological relationships between *M. mallei* and *M. pseudomallei*.—*J. infect. Dis.* 86. 46-51. [Authors' summary modified.] 1879

CRAVITZ, L., & MILLER, W. R. (1950.)
Immunologic studies with *Malleomyces mallei* and *Malleomyces pseudomallei*. II. Agglutination and complement fixation tests in man and laboratory animals.—*Ibid.* 52-62. [Authors' summary copied verbatim.] 1880

I. The techniques of the agglutination and complement fixation tests with *Malleomyces mallei* [*Pfeifferella mallei*—Ed. V.B.] and *Malleomyces pseudomallei* [*Pf. whitmori*—Ed. V.B.] have been described in detail.

The antigenic relationships of 8 strains of *Pf. mallei* and 2 strains of *Pf. whitmori* were investigated by means of cross agglutination, cross complement fixation, and agglutinin absorption studies. The following relationships were observed: (1) The *Pf. mallei* strains fell into three groups: (a) C3, C4, C7; (b) C5, C6; (c) 2023, 2024, 2MP. (2) The two *Pf. whitmori* strains were almost identical serologically. (3) The *Pf. mallei* strains in group (a) were more closely related to the *Pf. whitmori* strains than to *Pf. mallei* groups (b) and (c).

The agglutination of *Pf. whitmori* was largely a function of its flagellar antigen. The cross agglutination with *Pf. mallei* was a function of common somatic antigenic factors.

Efforts to prepare a complement fixation antigen which would differentiate between *Pf. mallei* and *Pf. whitmori* were unsuccessful. A chemically purified non-protein fraction which was antigenically

active in the complement fixation reaction appeared to be common to the two species.

II. The complement fixation test appeared to be specific for *Malleomyces* infection but did not differentiate between glanders and melioidosis.

The agglutination test was more sensitive than the complement fixation test, and practically all normal serums gave agglutination in low dilution. If the normal agglutinin titers have been previously determined, an early progressive rise in titer may be diagnostic of the disease before the complement fixation test becomes positive.

The agglutination and complement fixation tests are excellent diagnostic aids for glanders and melioidosis in man as well as in animals.

TRAUTWEIN, K. (1949.) Epidémiologie et prophylaxie du rouget du porc. [**Epidemiology and prevention of swine erysipelas.**]—*Bull. Off. internat. Epiz.* 32. 222-231. 1881

A general article on the factors predisposing to *Erysipelothrix rhusiopathiae* infection and its prevention by prophylactic immunization. This latter includes some discussion of the effectiveness of a preparation in which the antigen is absorbed on aluminium hydroxide and attenuated by formalin.—MALCOLM WOODBINE.

GYSLER, M., & MEIER, O. (1949.) Die Behandlung des Schweinerotlaufs mit Penicillin. [**The treatment of swine erysipelas with penicillin.**]—*Schweiz. Arch. Tierheilk.* 91. 264-268. 1882

Over 50 pigs with swine erysipelas were treated with a single injection of 150,000-300,000 Oxford units of penicillin in oil and beeswax and 10-20 ml. of immune serum. The temperatures of all of them remained normal and they were eating well within 15 hours. The authors advise active immunization two weeks after recovery, using the simultaneous method to avoid recurrence.—W. STECK.

MONAGHAN, D. H. (1949.) **Penicillin in the control of swine erysipelas. [Correspondence.]**—*Vet. Rec.* 61. 874. 1883

A dose of 100,000-500,000 units of penicillin to an animal weighing 160-180

lb. gave spectacular results, but chronic arthritis often developed six weeks to three months after treatment.—R. MARSHALL.

SVENKERUD, R. R. (1948.) Listerellainfeksjoner, spesielt med henblikk på deres forekomst hos hesten. [*Listerella (Erysipelothrix) monocytogenes*, infections, especially in horses.]—Norsk Vet Tidsskr. 60. 321-340. [English summary.] 1884

A review is given of the disease in animals and two new equine cases are recorded, one in great detail.

The first was a two-year-old horse. It was ill for about ten days before death; there was general irritability and in particular difficulty in eating owing to inflammation of the masseter muscles and there was evidence of oesophageal paralysis. There was also ulcerous stomatitis.

The second case was a two-year-old animal which had a similar syndrome to that of the first case and it died after a few days' illness. The only macroscopic lesion seen P.M. was muscular oedema. *E. monocytogenes* was isolated from the masseter muscles and liver. The bacteriological work is detailed and the histology of infective foci in the internal organs is described and illustrated.—J.E.

TUNNICLIFF, E. A. (1949.) *Pasteurella mastitis in ewes.* — Vet. Med. 44. 498-502, & 506. 1885

Over a number of years the author has investigated an acute mastitis in ewes usually seen when the lambs are 3-4 months old. It is associated with the presence of a pasteurella organism and can be reproduced by inoculating cultures via the teat canal.

A nodular condition of the udder is also described which may be associated with a chronic pasteurella infection.

Strains have also been isolated from apparently normal udders, but whether they were pathogenic for other ewes is not stated.

Formolized bacterins have not proved of value as immunizing agents. Sulphamethazine given in the early stages had some therapeutic value.—D. LUKE.

CHRISTIAN, A. B. (1948.) *Control of pneumonia in cattle with sulfameth-*

azine.—Vet. Med. 43. 518-521. 1886

Sulphamethazine therapy is described in a herd of Jerseys where pneumonia among calves was a serious problem. Diagnosis was based on clinical symptoms and various doses from 1-2 g. per lb. body weight were given *per os*. No toxic effects were observed and routine dosage of 1 g. per lb. was finally adopted. It was found more convenient and effective to administer the drug in the food of the whole contact group of calves as soon as symptoms appeared in one or more of the group, and effective blood concentrations of the drug, 5 mg. per 100 ml., were obtained six hours after administration *per os*. Intravenously, effective concentration was obtained in one hour; of 43 calves treated 97.6% recovered. Prognosis depended on the degree of lung involvement before treatment was begun. Adult cattle were treated along the same lines with equally good results.—G. V. LAUGIER.

KISER, J. S., PRIER, J., BOTTORFF, C. A., & GREENE, L. M. (1948.) *Treatment of experimental and naturally occurring fowl cholera with sulfamethazine.*—Poult. Sci. 27. 257-262. 1887

Compared with untreated controls there was a 63-85% reduction in mortality in experimentally produced fowl cholera, using sulphamethazine and sodium sulphamethazine. In field cases the reduction in mortality was from 45-75%; 0.5-1% of the drug in the food and 0.1% in the drinking water gave satisfactory results.—D. LUKE.

GIRARD, G. (1949.) Tularémie provoquée par piqûre de tique "*Dermacentor marginata*." [*Tularaemia transmitted by the bite of the tick Dermacentor marginata*.] — Bull. Mém. Soc. Méd. Hôpit. de Paris. Nos. 5/6, pp. 171-173. [Abst. in Bull. Hyg., Lond. 24. 577-578. (1949), slightly amended. Signed: H. J. O'D. BURKE-GAFFNEY.] 1888

In a previous paper (1948) the author drew attention to the importance in France of the hare in the transmission of tularaemia (it was incriminated in 47 of 52 cases confirmed serologically up to June, 1948). He also suggested that it was yet to be confirmed whether insects might play a definite part in transmission; several

clinically suspicious cases had a history of insect bites, but tularaemia had not been confirmed serologically.

He now quotes a case from a small community in the Côte-d'Or (Haute-Marne) where 27 cases of tularaemia had been found among the 52 mentioned above.

Clinically the case was one of tularaemia, and the features included an enlarged axillary gland. The blood was sent to the author's laboratory for serological diagnosis of tularaemia and was positive 1/200. A few days before symptoms appeared the patient had been bitten by a "wood louse" (*pou de bois*). His local doctor (who reported the case) noted a direct relation between the bitten area and the enlarged gland. The patient had not handled horses or other suspect animals in the period before his illness.

The author asked the local doctor for information regarding the "wood louse"; he obtained from him a specimen identical with that which had bitten the patient and which was locally known as "pou de bois." It was later identified by Dr. Colas-Belcour as *Dermacentor marginata* (= *reticulatus*). The local doctor stated that this tick was parasitic on wild animals such as polecats, buck, foxes and boars and also on domestic animals (dogs, cats, sheep). The author refers to a case of tularaemia in the Côte d'Or after the bite of a wild boar [*Bull Hyg., Lond.* (1948) 23, 855]. Yet this tick had not been reported on hares.

The author places some reserve on the identity of the tick in the present case with that which bit the patient. He quotes BRUMPT who stated (*Précis de Parasitologie*, 1936) that he had never seen *D. reticulatus* attacking man. Nevertheless, Colas - Belcour identified the present arthropod from a specimen sent to him by a doctor who had removed it from the skin of a child in Lagny in October, 1947.

ANON. (1948.) **Avoidable meningitis.**
Memorandum drawn up by the Public
Health Laboratory Service and the
London Sector Pathologists' Committee.
Bull. Hyg., Lond. 23. 79-80. 1889

This memorandum draws attention to the risks of meningitis from the direct inoculation of organisms into the spinal

canal during intrathecal injections. The organisms usually incriminated in human infections are *Pseudomonas pyocyanea* and related organisms capable of multiplication at room temperature; less frequently staphylococci and other skin contaminants may be responsible. The sources of contamination are listed as follows:—(1) Apparatus inefficiently sterilized or contaminated during use, (2) "Sterile" water or saline used to rinse the apparatus, (3) Hands of operator or assistants, (4) Skin of patient, (5) Anaesthetic, antibiotic or other solutions. Preventive measures recommended are:—(1) All apparatus should be sterilized by (a) autoclaving at 15-20 lb. pressure for 20 min., or (b) dry heat of 160°C. for one hour, or (c) boiling for 5 min. (2) "Sterile" water or saline is unnecessary for rinsing or cooling if apparatus is sterilized as recommended. (3) The operator's hands should be scrubbed as for a major operation. (4) The patient's skin should be prepared by thorough washing with soap and warm water followed by thorough swabbing with tincture of iodine or 70-90% alcohol. (5) Sealed glass ampoules are preferable to rubber-capped bottles intended for repeated use. The caps of rubber-capped bottles should be swabbed with 70% alcohol before inserting the needle.

—T. W. F. PAY.

SCHADE, A. L. (1949.) **Cobalt and bacterial growth, with special reference to *Proteus vulgaris*.**—*J. Bact.* 58. 811-822. [Author's summary copied verbatim.] 1890

The growth of representative species of bacteria, both aerobic and anaerobic as well as gram-positive and gram-negative, is completely inhibitable by concentrations of cobalt ranging from 1 to 100 ppm. The actual inhibiting cobalt concentration depends upon the sensitivity of the individual strain of bacterium, the number of cells per ml used as inoculum, and the constituents of the growth medium. As an example of the importance of the last-named factor, the concentration of cobalt necessary to inhibit the growth of *Proteus vulgaris* in meat extract peptone broth is 100 times that required in a synthetic

medium of glucose and ammonium sulphate.

Of 17 amino acids tested under physiological conditions of pH and temperature, only histidine and cysteine are capable of overcoming the growth inhibition of *P. vulgaris* by cobalt. For complete prevention or reversal of the growth inhibition, the molar ratio of histidine to cobalt must be at least 2 to 1.

The pH of the medium and the temperature of incubation have no effect on the concentration of cobalt required to inhibit the growth of *P. vulgaris*. Irrespective of the presence or absence of oxygen, the rates of growth of this species and of *Staphylococcus aureus* are initially affected by the same cobalt concentrations. For complete inhibition, approximately two to three times as much cobalt is required under anaerobic as under aerobic conditions.

Cells of *P. vulgaris*, incubated at 37°C. for 2 hours in nutrient broth containing an inhibiting concentration of cobalt, fail to show any increase in cell size or evidence of cell division. By the end of the 2-hour incubation period, however, they do show an increase in stainability with crystal violet comparable to that of the controls. If cobalt is added to nutrient media inoculated with cells in their resting, lag, and logarithmic phases of growth, their viability after a period of 4 hours is decreased to 75, 40, and 2 per cent of the initial value, respectively. The rate of reduction in the viability of resting cells effected by cobalt in a nutrient medium or in phosphate buffer is greater than the rate of death of cells in phosphate buffer alone.

RYAN, F. J., & SCHNEIDER, L. K. (1948.)
The consequences of mutation during the growth of biochemical mutants of *Escherichia coli*. I. The pattern of adaptation of histidineless cultures. —
J. Bact. 56. 699-708. [Authors' summary copied *verbatim*.] 1891

RYAN, F. J., & SCHNEIDER, L. K. (1949.)
The consequences of mutation during the growth of biochemical mutants of *Escherichia coli*. II. The inhibition of histidine-independent bacteria by histidineless bacteria in unshaken cultures.

III., The inhibition of histidine-Independent bacteria by histidineless bacteria in aerated cultures. IV., The mechanism of inhibition of histidine-independent bacteria by histidineless bacteria. —
J. Bact. 58. 181-189; 191-200; & 201-213.
 [Authors' summary copied *verbatim*.] 1892

I. During the growth of populations of histidineless *Escherichia coli*, mutations occur which make some of the bacteria independent of an external supply of histidine. These histidine-independent mutants grow in the absence of added histidine, and such growth from an inoculum of histidineless bacteria is termed adaptation. The extent to which adaptation occurs is inversely proportional to the histidine content of the medium. On high concentrations adaptation does not take place at all. As a result there is a dip in the curve describing adaptive growth as a function of histidine concentration. This dip can be progressively eliminated by adding histidine-independent bacteria, which artificially decreases the proportion of histidineless bacteria in the inoculum. Pure histidine-independent cultures show no dip in the curve for their growth is not influenced by histidine in the medium.

The depression of adaptation is a function of the number of histidineless bacteria present. As the histidine concentration increases, the number of histidineless organisms whose growth is supported increases, and the adaptative growth of histidine-independent mutants decreases. The latter are in some way prevented from growing by histidineless bacteria grown on suboptimal concentrations of histidine.

II. In unshaken cultures of *Escherichia coli*, in which the pH decreases in proportion to the number of bacteria, the adaptive growth of histidine-independent back mutants takes place until intolerable pH's arise. The pH tolerance of these back mutants is determined by the proportion of parental histidineless bacteria also present in the culture. This restriction by the histidineless bacteria is not brought about by the depletion of something from the medium but rather by the production of some nonspecific substance (or substances) that is formed in proportion to the

number of bacteria. These results, in conjunction with those reported in the following paper [(1949) see part III. below], are discussed in the final paper of this series [(1949) see part IV. below].

III. A method is described for the convenient measurement of the logarithmic rate of growth of *Escherichia coli* under conditions of shaking when the pH remains stable. Either the exhaustion of glucose or of histidine can be made to limit growth. Under these conditions adaptation of cultures of histidineless bacteria by the overgrowth of histidine-independent mutants occurs in the same way as in unshaken cultures. Similarly the adaptive growth of the histidine-independent bacteria is restricted by the presence of histidineless organisms on intermediate concentrations of histidine.

Unlike the situation in unshaken cultures, the production of inhibitory substances by the histidineless bacteria could not be demonstrated. Rather, the growth of adapted cultures is limited by the exhaustion of glucose from the medium, and this despite the fact that unequal amounts of growth occurred on the different concentrations of histidine.

IV. The restriction of the growth of histidine-independent bacteria by histidineless organisms was found, in unshaken and in aerated cultures, to be due to different causes. Yet in both instances there is the common principle that involves the modification of the medium by histidineless bacteria in the stationary phase.

In aerated cultures, histidineless bacteria cease to grow when the histidine supply of the medium is exhausted, but they continue in the stationary stage to consume glucose until it too is absent from the medium. In the meantime the small number of histidine-independent back mutants contained by histidineless cultures continue to grow. They are not influenced by the exhaustion of histidine from the medium but cease growth when the glucose is gone. The time of glucose disappearance, and hence the extent to which histidine-independent bacteria can undergo adaptive growth, depends upon the number of histidineless bacteria that are consuming glucose in the stationary stage. The

number of histidineless bacteria is, in turn, a function of the initial concentration of histidine. For this reason, the adaptive growth of histidineless bacteria is greater on low concentrations of histidine and eventually does not take place as the histidine concentration becomes high enough.

The rates of glucose utilization during growth and in the stationary stage have been determined and used to calculate the expected extents of adaptive growth and the expected composition of adapted cultures. The close correspondence of theory and experiment verifies the hypothesis.

In unshaken cultures the adaptive growth of histidine-independent bacteria is regulated in a similar fashion. The glucose supply, however, does not become limiting. Rather, the histidineless bacteria in the stationary phase produce acid and an inhibitor (or inhibitors), which limit the amount of growth that is possible at any pH. This modification of the medium also occurs as a function of the number of histidineless bacteria and is responsible for the differences in the restriction of the adaptive growth of histidine-independent bacteria on different concentrations of histidine.

VARELA, G., OLARTE, J., & MATA, F. (1948.) *Salmonelas en las ratas de la ciudad de Mexico. Estudio de 1,927 Rattus norvegicus. [Salmonella infection of rats in Mexico City.]—Rev. Inst. Salubridad y Enfermedades Trop. Mexico. 9. 239-243. [Abst. in Bull. Hyg., Lond. 24. 607. (1949), copied verbatim. Signed: H. HAROLD SCOTT.]* 1893

Conflicting reports have been issued regarding the transmission to man of *Salmonella* organisms which infect rats. The authors have, therefore, examined nearly 2,000 of these animals by culture from the spleen. Of the total, 1,309 had been poisoned by sodium fluoracetate, the other 618 had been caught alive. In the former groups, 8 yielded a growth of *Salm. pensacola* var. *anáhuac*, 557 members of the *Bact. coli* and paracolony group and 283 of *Proteus*. Of the 618 caught alive, 26 gave a growth of *Salmonella*, namely, 8 *Salm. pensacola*, 17 *Salm. pensacola* var.

anáhuac, and one of *Salm. newport*. In no instance was *Salm. typhi-murium* isolated. Others have reported this last in large numbers among rats and mice and the authors believe that this is the case only when the rodents are "in a pathological state," whereas they are normal hosts of *Salm. pensacola*.

COLE, R. K. (1948.) **Sulfonamides versus *Salmonella pullorum* in adult chickens.**—*Poult. Sci.* **27**. 427-429. 1894

Sulphamerazine, sulphadiazine and sulphaguanidine were fed to groups of pullorum test positive hens for 61 days out of a total period of 114 days. Forty of the 43 birds remaining alive at the end of the experiment gave a positive reaction to the pullorum test.—D. LUKE.

CHANG, K., & STAFSETH, H. J. (1950.) **Influence of various factors on the bacteriostatic and bactericidal action of streptomycin on *Salmonella pullorum*.**—*Poult. Sci.* **29**. 130-138. [Authors' summary copied *verbatim*.] 1895

Streptomycin showed bactericidal action against *S. pullorum* in a concentration of 0.031 mg per ml of tryptose broth medium. The older the culture and the smaller the inoculum, the higher was the bactericidal titre of streptomycin. Streptomycin showed the highest bactericidal activity at pH 6.9 and 8.0. On the acid side, the lower the pH value of the medium, the lower was the bactericidal activity. Different sugars produced different effects on the bactericidal activity of streptomycin with no direct relation to the amount of acid produced from the fermentation of the sugars by *S. pullorum*. The inactivation of streptomycin by certain reducing agents may not relate to the reducing nor the oxidizing mechanisms but rather to certain specific reactions between the antibiotic and the reducing agent or its by-products. Different dyes showed different effects on the bactericidal activity of streptomycin. The effect was not parallel with their own bacteriostatic action against *S. pullorum*. Sodium sulfadiazine enhanced the bactericidal activity of streptomycin. The antibacterial activity of streptomycin in serum from streptomycin-treated birds lasted

about 3 hours after intramuscular injection of the antibiotic. The activity was lost gradually.

REUTER, H. (1948.) Untersuchungen über die Thermostabilität der Paratyphus-Enteritis-Erreger und ihrer Toxine. [Thermostability of salmonella organisms and toxins.]—*Berl. Münch. tierärztl. Wschr.* No. 8, pp. 87-89. 1896

As in Germany new laws about meat inspection are in preparation the question of *Salmonella* infection of carcasses seemed important. None of 35 *Salmonella* cultures could stand heating at 80°C. for more than a few moments. Eighty min. at 70°C. or 4 hours at 65°C. was sufficient to sterilize all the cultures. Heat-stable endotoxins could not be demonstrated in any of these cultures—which included six *S. gaertner* strains—either in laboratory animals or when the author himself ingested boiled cultures or artificially infected boiled meat. R. infers, therefore, that meat poisoning through organisms of the *Salmonella* group can occur only if living organisms are present.—A. MAYR-HARTING.

KAMINSKA, A., & SZAFLARSKI, J. (1949.) Badania serologiczne obsługi oborowej w kierunku brucellozy. [Serological examinations for brucellosis of people employed in cow-sheds.]—*Med. weteryn.* **5**. 511-513. 1897

In agglutination and complement-fixation tests of the blood serum of 175 women and 30 men employed in cattle byres, 11.4% of those from the women and 21% of those from the men yielded positive reactions. The authors point out the danger of infected human beings passing the infection on to cattle.

MANSO SOTO, A. E., & RISPOLI, J. A. (1948.) Reacción opsonocitofágica en la brucelosis. [The opsonocytophagic reaction in brucellosis.] *Universidad Buenos Aires: Misión de Estudios de Patología Regional Argentina.* Publ. No. 74, pp. 33-41. [Abst. in *Bull., Hyg., Lond.* **24**. 495-496 (1949), copied *verbatim*. Signed: H. HAROLD SCOTT.] 1898

An account of some work done on the opsonocytophagic reaction for the diagnosis of brucellosis. The authors found that

curves of titres of agglutinins and bacteriotropins do not coincide; a serum could be positive to the one reaction and negative to the other, or *vice versa*. Some details are given of the strains used in the work.

HARDING, H. B., & RALEIGH, G. W. (1950.)
2, 3-dimercaptopropanol (BAL)-penicillin compatibility and brucellastasis in vitro. — *J. infect. Dis.* **86.** 88-94.
 [Authors' summary and conclusions copied *verbatim*.] 1899

The chemistry and acceptable theories regarding the mode of operation of penicillin and 2,3-dimercaptopropanol (BAL) are reviewed. The necessity of determining the compatibility of these compounds is indicated. The literature is reviewed and theoretical considerations regarding the importance and role of sulfhydryl enzymes and exogenous sulfhydryl compounds are discussed. 2,3-Dimercaptopropanol (BAL) exerts no effect on the bacteriostatic action of penicillin under the conditions of these experiments: 2,3-Dimercaptopropanol (BAL) is an effective brucellastatic agent under the conditions of these experiments.

HALL, W. H., & SPINK, W. W. (1948.)
Therapy of experimental brucella infection in the developing chick embryo. I. Infection and therapy via the allantoic sac.—*J. Immunol.* **59.** 379-391. 1900

SHAFFER, J. M., & SPINK, W. W. (1948.)
Therapy of experimental brucella infection in the developing chick embryo. II. Infection and therapy via the yolk sac. —*Ibid.* 393-403. 1901

I. The effectiveness of chemotherapeutic agents against *Brucella* was tested in the allantoic sac of the chick embryo. The basic measure was taken as LD₅₀, which is the dilution of the bacterial inoculum to kill 50% of the embryos. The "therapeutic index" of the substances tested was derived from the ratio of LD₅₀ for treated infected embryos over LD₅₀ of untreated infected ones. Another measure of therapeutic efficacy was the percentage of allantoic fluid and embryonic livers which yielded no viable *Brucella* organisms on subculture. All untreated infected eggs yielded positive cultures. The percentage of eggs sterilized by treat-

ment was dependent on the size of the bacterial inoculum.

Sulphadiazine and streptomycin were found to be therapeutically effective, and the result was enhanced if they were used in combination. Penicillin and stilbamidine had a slight effect. *p*-Aminobenzoic acid proved very toxic for the embryos and had a negative effect.

II. Methods for testing chemotherapeutic agents against *Brucella* infection in the chick embryo [see preceding abst.] were improved and treatment with a combination of drugs was followed up. The injections for infection and for treatment were made into the yolk sac. The measures for therapeutic effectiveness were (1) the time after which 50% of the embryos were still alive, corrected for deaths not resulting from infection, (2) the percentage of treated embryos from the livers of which *Brucella* organisms could not be isolated. A remarkable enhancement of the therapeutic effect by combining streptomycin and sulphadiazine was again noted; it was greater than merely additive.

—A. MAYR-HARTING.

LISBONNE. (1945.) Reçrudescence générale de la fièvre ondulante dans le Midi de la France. Inefficacité de la vaccination animale; nécessité d'une "politique" antimélitensique. [Undulant fever in the South of France. Inefficacy of animal vaccination; necessity for control measures.] — *Bull. Acad. Méd. Paris.* **129.** 526-529. 1902

The shortage of cows' milk during the war resulted in large numbers of people, in towns as well as in country districts, keeping goats as a source of the family milk supply. Few purchasers of goats troubled to get them tested for brucellosis and selected their goat on its appearance. L. points out that appearance is a bad guide in so far as brucella infection is concerned; very often the best looking goat is one which, following abortion in a previous pregnancy, has put on condition since it was not subjected to the strain of heavy milk production. This increase in goat keeping was followed by a very marked rise in cases of *Br. melitensis* infection in man and many hundreds of cases occurred.

Discussing means of control L. advocates: (a) slaughter of all goats which have aborted or which give a positive reaction on test, (b) prohibition of sale of goats without a certificate that they have been tested and found negative, (c) prohibition of sale of cheese made from goats' milk unless it has been pasteurized, (d) boiling of all goats' milk before use, (e) prohibition of the vaccination of goats with living avirulent vaccines since, from the point of view of spread of infection to man, these vaccines are useless. L. has been able to isolate virulent organisms from the milk and vaginal mucus of vaccinated goats. Vaccination may reduce the incidence of abortions in infected goats, but it does not reduce the elimination of virulent organisms in the milk and discharges. L. is doubtful whether vaccination of human beings is of any real value. [No information is given regarding the nature of the avirulent strains which have been used as vaccines.]—M.C.

GOLEM, S. B. (1948.) Türkiye 'de brü-selloz mücadelesine esas teşkil edecek konular üzerinde araştırmalar. [**Studies on the method of control of brucella infection in Turkey.**] — *Türk İjiyen ve Tecrübi Biyoloji Dergisi*. Ankara. **8**. 20-93. [French summary.] [Abst. in *Bull. Hyg., Lond.* **24**. 327 (1949), copied verbatim. Signed: R. LOVELL.] **1903**

Brucella melitensis is more common than the other types of *Brucella* in Turkey and its control by the serum agglutination test of suspected animals is not satisfactory, largely because of the lack of uniformity in methods and interpretation. Some unification appears to be necessary and comparisons were therefore made with the methods used in other countries.

A substance called Brucellergin p was prepared by acid extraction of suspensions of *Brucella*; it was not antigenic, but gave an intradermal reaction in dilutions of 1:100 in guineapigs infected with *Brucella*. Tests were made in naturally infected animals by injection of the substance into the caudal fold. Comparisons were made with the uninoculated fold, but a single injection was not satisfactory. Two injections made at intervals of 48 hours and examined 24 hours later enabled one

to formulate the following guide as to interpretation.

A local reaction with at least 5 mm. increase in the skin thickness was regarded as positive; an increase of 5 mm. without local reaction or an increase of from 3 to 5 mm. was suspicious, whereas an increase of less than 3 mm. was considered negative. The test was compared with the result of agglutination reactions and the allergic test was more favourably considered.

Both tests were made in cattle artificially infected and it was shown that the allergic reaction developed more slowly than the formation of agglutinins and remained detectable for a longer period.

MOSIER, J. E., BARNER, R. D., & DAVIS, J. C. (1950.) **Histoplasmosis in dogs.** — *J. Amer. vet. med. Ass.* **116**. 128-131. **1904**

In Kansas five cases of this chronic, fatal fungal disease have been detected. Two types of the disease both characterized by progressive emaciation have been noted. In one there is involvement of mesenteric lymph nodes with ascites, and in the other, the systemic form, there is enlargement of liver, spleen and all lymph nodes.

Diagnosis depends on microscopic recognition of organisms in tissues or culture. The possibility of dogs being sources of human infection is mentioned as well as the failure of various attempted treatments.—K. G. TOWERS.

COLE, C. R., PRIOR, J. A., & SASLAW, S. (1950.) **Detection of canine histoplasmosis by intradermal histoplasmin test.** — *J. Amer. vet. med. Ass.* **116**. 135-138. **1905**

The clinical recognition of histoplasmosis is difficult and cases are most commonly established on P.M. examination. Cultural examination or biopsy can be applied during life and the authors have found that an intradermal test using the flank skin fold may be a valuable clinical aid, although it is realized that the specificity of the reactions is unknown. Tests using 0.1 ml. of diluted filtrate from broth cultures of *H. capsulatum* were carried out on 1,314 dogs. After 48 hours the presence of oedema and erythema was considered a positive reaction and seven

such cases were detected. In four of these dogs the disease was identified by cultural and/or microscopic methods. In an advanced case of histoplasmosis a positive reaction was not obtained.—K. G. TOWERS.

BADER, D. W. (1949.) **Canine actinomycosis.**—*Vet. Med.* **44.** 477-478. 1906

A note on actinomycosis of the liver in a dog.—G. V. LAUGIER.

WEHNER, T. (1949.) Zur Frage der Therapie der Aktinomykose. [**The therapy of actinomycosis.**]—*Tierärztl. Umsch.* **4.** 103-104. 1907

A note on the treatment of actinomycosis, containing no new information.

—R. MARSHALL.

VANBREUSEGHEM, R. (1949.) Technique de Filatov et culture de dermatophytes. [**The Filatov technique for cultivation of dermatophytes.**]—*Ann. Parasit. hum. comp.* **24.** 555-558. 1908

The preparation of the culture medium—Sabouraud + placenta—is described. The following dermatophytes were grown, according to Filatov's technique: *Trichophyton schoenleini*, *T. violaceum*, and *T. glabrum*, and *Sabouraudites felineus* and *S. duboisi*. Placenta contains a substance or substances which stimulate the growth of dermatophytes.—W. R. BETT.

VANBREUSEGHEM, R. (1949.) La culture des dermatophytes *in vitro* sur des cheveux isolés. [**In vitro cultivation of dermatophytes on isolated hairs.**]—*Ann. Parasit. hum. comp.* **24.** 559-573. 1909

A new technique is described for growing dermatophytes on isolated hairs *in vitro*. By this method they assume a morphological form identical with that seen in culture media. In more than 200 experiments with 25 species of dermatophytes belonging to four genera:—*Ctenomyces*, *Sabouraudites*, *Trichophyton* and *Epidermophyton*, none were seen in the parasitic phase.—W. R. BETT.

LITTLE, R. B., BECK, J. D., & McCANON, J. V. (1950.) **An outbreak of bovine leptospirosis in Pennsylvania.**—*Vet. Med.* **45.** 104-110. 1910

An outbreak of leptospirosis occurred

in Pennsylvania in the summer and autumn of 1948 and involved 33 cattle on seven farms. (It is suggested that a previous outbreak in Pennsylvania in 1945 which was described as "Meteorological haemoglobinuria" may have been leptospirosis.) The symptoms were fever, anorexia, depression, abortion, and a thick, viscid, yellowish secretion was obtained from a flaccid udder. Haemoglobinuria occurred in 50% of affected animals. Early attempts to isolate leptospira in g. pigs and hamsters failed, but serological tests of the blood of cattle that had recovered were positive. A strain of leptospira was eventually obtained from g. pigs inoculated on the farm with blood and milk from a sick cow (body temperature 104.6°F.); a second strain was isolated from another herd. The strains were similar in their pathogenic and antigenic properties to those isolated in New Jersey. No evidence of pathogenicity for man was obtained, the strains being typical bovine ones.

In an appendix, one of the authors (McCahan) refers to studs of horses in which cases of blindness and abortion occurred. The sera of some of the affected animals reacted to a high titre with the New Jersey and Pennsylvania strains of leptospira. Attempts to isolate the organism were unsuccessful.—E. G. WHITE.

BOYER, C. I., Jr., DAMMIN, G. J., & REYES, F. M. (1948.) **Canine leptospirosis. First report of *Leptospira canicola* in the dog in Puerto Rico.**—*Puerto Rico J. publ. Hlth.* **24.** 177-84. [Abst. in *Bull. Hyg., Lond.* **24.** 497. (1949), copied verbatim. Signed: J. C. BROOM.] 1911

Clinical, pathological and serological details are given of what is considered to be the first case of canicola fever recognized in a dog in Porto Rico. The outstanding symptoms were jaundice, oliguria, vomiting, bleeding gums and melæna.

At autopsy, hæmorrhages were noted in the lungs and in parts of the small intestine. The liver and spleen were normal in size. Microscopically, dissociation of the liver cords was pronounced, and necrosis had occurred in scattered areas. The kidneys showed early acute glomerulonephritis and interstitial nephritis. No leptospiræ were visible in sections stained by

Levaditi's method, nor in fresh preparations of liver-kidney suspension. Cultures of this suspension remained sterile. Guinea-pigs inoculated with whole blood, taken before death, and with the suspension, remained healthy except for a slight rise of temperature.

Blood serum from the dog agglutinated *Leptospira canicola* to a titre of 1/30,000 and *L. icterohæmorrhagiæ* to 1/10,000. Serum taken from the guinea-pigs 6-8 weeks after inoculation showed partial agglutination with *L. canicola* and none with *L. icterohæmorrhagiæ*.

In an attempt to trace the source of infection, blood was examined from 6 dogs from the same district. All were negative.

[The clinical and pathological findings in this case are at least as suggestive of yellows (infection with *L. icterohæmorrhagiæ*) as of canicola fever. Without the results of absorption tests the difference in the agglutination titres cannot be considered as diagnostic. The guinea-pig evidence, such as it is, favours canicola fever. Definite conclusions might have been reached if hamsters had been used as the experimental animals, or if microscopical examinations and cultures of the peritoneal fluid had been made at regular intervals after inoculation.]

LEREBOULLET, J., KOŁOCHINE-ERBER, & CASTEL. (1949.) Un cas de leptospirose à "*Leptospira canicola*." Transmission probable par morsure de chien. [A case of canicola fever probably caused by dog-bite.]—*Bull. et. Ném. Soc. Méd. Hôpit. de Paris*. Nos. 5/6, pp. 176-179. [Abst. in *Bull. Hyg., Lond.* **24**. 578-579. (1949), copied *verbatim*. Signed: J. C. BROOM.] **1912**

This case of canicola fever, in a woman aged 45, presented certain unusual features in addition to the customary fever, headache, neck-stiffness, conjunctivitis and digestive disturbance. Towards the end of the first week of illness, a cough and dyspnoea developed, and signs of congestion were noted at the bases of both lungs. The urine contained a few granular casts, but was free of albumin. The conjunctival injection was very intense, and persisted for some weeks after the patient left hospital. A couple of months later a con-

siderable amount of her hair fell out. [Loss of hair is often recorded as a sequel to canicola fever in dogs.]

The diagnosis was confirmed serologically, and serum from the patient's dog also agglutinated *Leptospira canicola* to a high titre. This animal, which had bitten the patient one week before the onset of symptoms, is considered to have been the source of infection, although no leptospiræ could be seen in its urine at the time of examination.

GUENTHER-KUEHNE, H., RIMPAU, W., & SCHUBERT, H. (1949.) Ueber 20 Fälle von Canicolasieber (München, Augsburg, Fürth, Coburg, Soldau. [Twenty cases of canicola fever.]—*Dtsch. med. Wschr.* **74**. 129-33. [Abst. from abst. in *Bull. Hyg., Lond.* **24**. 497. (1949). Signed: J. C. BROOM.] **1913**

The authors have treated 8 human cases of canicola fever, and had access to the records of 12 others, the main features of which are summarized.

From biochemical investigations it is suggested that the renal lesion consists of localized areas of acute interstitial nephritis, due to the presence of leptospiræ and possible release of toxins causing damage to the tubules rather than to the glomeruli.

PACKCHANIAN, A., & SONNIER, A. B. (1948.) Incidence of leptospirosis in man and rodents in Galveston.—*Texas Reports on Biol. & Med.* **6**. 453-60. Abst. from abst. in *Bull. Hyg., Lond.* **24**. 578. (1949.) Signed: J. C. BROOM.] **1914**

The first 5 cases of Weil's disease recognized in Texas are reported.

A survey of the infection rate among local wild rats was carried out by microscopical examination and by inoculation of kidney suspension into guinea pigs. Leptospiræ were demonstrated microscopically in 21 of 93 *Rattus norvegicus* examined within 6 hours of death. Material from 14 of those infected was injected into 23 guinea-pigs, but only 2 infections resulted. White rats and white mice, inoculated with these strains, were found to be carriers when sacrificed one to two months later.

BRUNNER, K. T., & MEYER, K. F. (1950.) Effect of aureomycin on *Leptospira*

canicola and *Leptospira icterohæmorrhagiæ* in vitro and experimental carrier studies.—*Amer. J. vet. Res.* **11**, 89-90.

A concentration of 0.1 u.g. per ml. of aureomycin gave complete inhibition of growth of *L. canicola* and *L. icterohæmorrhagiæ* in Schüffner's medium. Ten times this concentration was bactericidal after 50-64 hours' incubation.

Of 50 young hamsters inoculated intraperitoneally with *L. canicola*, 45 survived when treated with penicillin within 43-72 hours of inoculation. Twenty survivors chosen at random were shown to be renal carriers when killed: the remaining survivors (25) from penicillin treatment (assumed to be carriers) were given 1 mg. of aureomycin intraperitoneally every eight hours for 3-5 days. When killed two days after the last inoculation of the drug the kidneys were sterile.

Four young dogs experimentally infected with *L. icterohæmorrhagiæ* and excreting leptospira in the urine were given 5 mg. and 40 mg. of aureomycin per kg. body weight by mouth every 12 hours for three days. Two animals given the larger dose ceased to excrete the organism after five days and were still negative one month later. One of two animals given the smaller dose continued to excrete the organism. These results indicate that aureomycin may be of value by the oral route for preventing dogs from becoming carriers.—E. G. WHITE.

RUST, J. H. (1948.) **Leptospirosis in Puerto Rican wild rats.**—*Puerto Rico. J. publ. Hlth.* **24**, 105-12. [Abst. in *Bull. Hyg., Lond.* **24**, 496. (1949), copied verbatim. Signed: J. C. BROOM.] **1916**

Examinations for leptospiral infections were made on 59 rats caught in and around the port of San Juan, Port Rico. The total consisted of 38 *Rattus norvegicus*, 13 *R. frugivorus*, 4 *R. rattus* and 4 *R. alexandrinus*. Judged by the length from tip of nose to root of tail, 34 were immature. Sections of liver and kidney, and cultures of kidney material were examined for the

presence of leptospiræ. Additional tests were carried out on eight rats trapped on a farm. Serum was tested for agglutinins, and a suspension of liver and kidney was injected into young guineapigs.

Leptospiræ were most easily demonstrated in sections stained by a silver impregnation method. This revealed 24 (39 per cent.) infected rats, of which 21 were *R. norvegicus*. Only 10 (30 per cent.) of the immature rats showed infection.

Only four of 30 cultures were positive, and only one strain was successfully subcultured.

All the guineapig inoculations gave negative results, although leptospiræ were seen in kidney sections of four of the rats so tested.

Other pathological observations made on this material showed that chronic periarteritis was common in the liver and kidney, and that a yellowish-brown pigment was present in the epithelial cells of the convoluted tubules of the kidney in a number of cases. Intranuclear inclusion bodies were seen in the same cells in other rats. These findings were not related to the presence of leptospiræ, but interstitial nephritis occurred more frequently among the infected rats.

GUIDA, V. O., & MONICI, N. (1949.) Estudo comparativo de metodos de pesquisa de *Leptospira* em ratos. [Methods for demonstration of *Leptospira* in rats.]—*Bol. Soc. paul. Med. vet.* **8**, 133-139. [English abstract slightly modified.] **1917**

Comparison is made of various methods. The culture method was found to be best for the demonstration of the parasite, but it requires greater technical care. The guinea pig inoculation method is of good practical use and is helpful in disclosing a high percentage of carriers. Combination of the two methods was best in the study of the incidence of *Leptospira*. The association of microscopic examination (dark field), histological examination and guinea pig inoculation proved most efficient in discovering carriers.

See also absts. 1976 (bacterial antigens); 1980 (*Staph. aureus*); 1986 and 1987 (*St. abortus-equi*); 2035 and 2036 (rumen micro-organisms); 2059-2061 (Zdár disease); 2084 (micro-organisms producing antibiotics); 2085-2087 (streptomycin); 2088 (*B. circulans*); 2089 (fradycin); 2090 (chloromycetin); 2091-2094 (penicillin); 2094 (cobra venom and bacteria); 2114 (*Cl. butyricum*); 2145 (staining of fungi); 2146 (electron microscopy); 2151 (*Str. mastitidis*); 2155 (report, W. Australia); 2156 (book, mycobacteria); 2157 (book, tropical medicine); 2158 (book, medicine); 2161 (book, penicillin).

DISEASES CAUSED BY PROTOZOAN PARASITES

KALUSCH, A. (1949.) Der Stand der Beschälseuche in Oesterreich. [*Trypanosoma equiperdum* infection in Austria.]—Wien. tierärztl. Mschr. 36. 298-300. 1918

T. equiperdum infection, first officially noted in Lower Austria in June, 1946, had its highest incidence in September, 1947.

Infection is diagnosed clinically, serologically and bacteriologically or microscopically. Treatment with neosalvarsan and mapharsen has proved satisfactory in most cases. Preventive measures are outlined. Castration or slaughtering of diseased mares is voluntary.—W. R. BETT.

STEWART, J. L. (1947.) Phenanthridinium 1553 as a preventive against animal trypanosomiasis in the Gold Coast.—J. Comp. Path. 57. 79-83. 1919

The prophylactic effect of phenanthridinium 1553 was studied in a series of experiments using zebu cows, West African Shorthorn cows, and pigs of British breeds and crosses between these and the indigenous pigs.

Cattle were protected against *Trypanosoma vivax* and *T. congolense* for periods up to one month. Pigs were protected against *T. vivax*, but not against *T. congolense*.

The drug had no action either protective or curative against *T. brucei* in cattle, pigs, donkeys or dogs.—M.C.

EVANS, J. T. R. (1950.) Bovine trypanosomiasis in the Sudan: mass treatment with antrycide.—Vet. Rec. 62. 59-60. 1920

In treatment with dimidium bromide of over 350,000 cattle with *Trypanosoma congolense* and *T. vivax* infection, about 1% died from the toxic effects of the drug. Losses from trypanosomiasis, however, were negligible.

In view of this toxicity, supplies of antrycide methylsulphate were obtained and about 200,000 head of cattle were given up to 5.0 mg. per kg. body weight as a subcutaneous injection of a 15% aqueous solution. Results of the trial are stated to have been excellent, although toxicity was noted, particularly in calves up to six months of age.—S. BRIAN KENDALL.

TOBIE, E. J., VON BRAND, T., & MEHLMAN, B. (1950.) Cultural and physiological observations on *Trypanosoma rhodesiense* and *Trypanosoma gambiense*.—J. Parasit. 36. 48-54. [Authors' summary copied verbatim.] 1921

A diphasic medium of simple preparation is described for the indefinite cultivation of *T. rhodesiense* and *T. gambiense*. The chief advantage of the medium is that it contains rabbit blood and thus obviates the necessity of using human blood. The flagellates develop only to the proventricular stage; hence the cultures are non-infective. The proventricular forms of both *T. rhodesiense* and *T. gambiense* consume sugar with the concomitant formation of acid. They are aerobic fermenters. Very little, if any, ammonia is produced by the living parasites.

AGUIRRE PEQUENO, E. (1947.) Presencia de *Trypanosoma cruzi* en mamíferos y triatomídeos de Nuevo León, Monterrey, México. — [The presence of *T. cruzi* in mammals and triatomines in Nuevo León, Monterrey, Mexico.]—Rev. Kuba Med. trop. Parasit. 3. 120-121. [Abst. in Rev. appl. Ent. Ser. B. 38. 8. (1950), copied verbatim.] 1922

Four of seven adults and 20 of 32 nymphs of an unidentified species of *Triatoma* taken in the huts of a small mining community at Los Ramones, in the State of Nuevo León, Mexico, in 1946, were found infected by *Trypanosoma cruzi*. In investigations on the animal reservoir, 47 of 65 opossums (*Didelphis mesamericana*) taken in that and a neighbouring locality were shown to be infected. These are the first records of natural infection in the State.

GOLDMAN, M. (1950.) The experimental infection of pupæ of *Philosamia cynthia* Drury (Lepidoptera: Saturniidae) with *Trypanosoma cruzi* Chagas.—J. Parasit. 36. 1-8. [Author's summary copied verbatim.] 1923

In vivo culture of *T. cruzi* within pupæ of a saturniid moth is reported. In addition to development of usual extracellular insect stages, the parasite showed intracellular stages similar to those found

ordinarily only in vertebrate hosts. Large numbers of parasites also developed in the mid-gut of this exclusively plant-feeding insect.

PIERCE, A. E. (1947.) **The serum agglutination reaction of *Trichomonas foetus*, Riedmüller, 1928.**—*Lab. J.* **8.** 328-244. **1924**

Mainly a summary of the work of ROBERTSON and of KERR & ROBERTSON [V.B. 12. 408], on the serological diagnosis of trichomoniasis in rabbits and cattle by an agglutination technique.

—G. M. URQUHART.

LUND, E. E. (1950.) **A survey of intestinal parasites in domestic rabbits in six counties in Southern California.**—*J. Parasit.* **36.** 13-19. [Author's summary and conclusions copied *verbatim*.] **1925**

The herd incidence of any or all species of coccidia was subject to much variation. There was a tendency for infections with the various species to be associated more frequently than chance distribution alone would require. All cases observed in this study were subclinical. The vast majority of fecal specimens yielded light oocyst concentrations or mere traces. None were heavy. Infections with *Eimeria stiedæ*, the cause of coccidiosis of the liver, were very frequent. There was no constant relationship between the incidence of coccidial infection and the morbidity reported for the rabbitries. The greatest single cause of mortality, as reported or observed, was mucoid enteritis, and this survey failed to demonstrate a direct relationship between that disorder and intestinal coccidiosis or other parasitism as encountered in this study. The incidence of coccidiosis was lower in this part of California in the winter of 1948 than at a similar season in previous years in which studies were made. This lower incidence is attributed to the scanty rainfall and the prevalence of drying winds, both of which factors are unfavorable to the sporulation and preservation of oocysts.

The only intestinal parasites other than coccidia that were detected in fecal specimens examined in this study were *Pas-salurus ambiguus*, the pinworm and, in a

single instance, the eggs of what was probably *Obeliscoides cuniculi*, the American stomach worm of rabbits.

FARLEY, H., FOOTE, L. E., PEARSON, C. C., & KLEWER, I. O. (1948.) **Anaplasmosis in Oklahoma cattle.**—*Bull. Okla. agric. Exp. Sta.* No. B-323. pp. 5-19. **1926**

This is a semi-popular account of anaplasmosis and the work on control carried out by the Oklahoma Veterinary Research Institute. Of 15 drugs tested as curative agents paludrine hydrochloride and quinoline disphosphate gave promising results. Further research is being directed towards the development of a vaccine, the detection of carrier animals, the finding of a suitable species of experimental animal smaller than cattle, and the artificial cultivation of *Anaplasma marginale*.

—M. L. CLARKE.

DIKMANS, G. (1950.) **The transmission of anaplasmosis.**—*Amer. J. vet. Res.* **11.** 5-16. **1927**

The evidence regarding the transmission of anaplasmosis in tabulated and 47 references are listed. It is suggested that certain species of ticks may be natural vectors, for it has been found that the males can conserve the parasite for some time, and in the females it can pass through the stages from larva to adult and also from the adult *via* the ovary to the larva. The possible roles of the species of North American ticks are discussed. In the case of mechanical transmission, either by contaminated instruments or by biting flies, it appears that the time interval between attacking a clinical case or a carrier and then a susceptible animal must be very short, i.e., less than 5 min.—K. G. TOWERS.

FARLEY, H., FOOTE, L. E., PEARSON, C. C., & KLEWER, I. O. (1950.) **Treating field and laboratory cases of anaplasmosis with anti-malarial drugs.**—*J. Amer. vet. med. Ass.* **116.** 124-127. **1928**

Under controlled experimental conditions six drugs were tested on cattle affected with anaplasmosis. A significant response in acute infections was obtained with paludrine, quinoline diphosphate and aralen diphosphate and the course of the disease was shortened. The drugs do not

destroy the parasites in carriers and an attempt in one case to inhibit the disease, or attenuate the infection, using large doses

of quinoline diphosphate giving during the incubation period, was unsuccessful.

—K. G. TOWERS.

See also absts. 2067 (trypanosomes, malarial parasites); 2136 and 2137 (A.I. and venereal disease).

DISEASES CAUSED BY VIRUSES AND RICKETTSIA

WALDMANN, O. (1948.) Sobre investigacion aftosa. [**Foot and mouth disease.**]—*Gac. vet., B. Aires.* 10. 147-155. 1929

A brief review of some of the history of F. & M. disease research, in particular, of the work of the author and his colleagues while at the German Research Institute, Insel Riems, off Greifswald.

—W. M. HENDERSON.

MENGES, R. W. (1948.) **Cyclic variations in prevalence of foot-and-mouth disease.**—*J. Amer. vet. med. Ass.* 113. 432-447; & 116. 9-10. 1930

M. reviews some of the early literature on F. & M. disease and having studied the statistics of the occurrence of the disease in Germany, Great Britain and Holland from the 1880's to the 1920's concludes that there is definite evidence that cyclic variations in prevalence of outbreaks occur.

[A second part of the paper was to have dealt with the disease in Mexico but was not published, the editorial comment being "... because conditions in Mexico at that time were changing so rapidly, it was not advisable to publish the second part." This unusual conclusion to the paper, apparently influenced by the course of recent events, is in sharp contrast to the first part which pays scant attention to literature published later than 1938 and deals principally with statistics dating up to 1911 for Germany and 1926 for Great Britain and Holland.]—W. M. HENDERSON.

EPSTEIN, B., & TOSI, H. C. (1948.) Consideraciones hispatológicas sobre la fiebre aftosa.—Studio de pared vesicular — inclusiones. [**Histopathological research on foot and mouth disease.—Study of the vesicle epithelium inclusions.**]—*Bol. mens. Direcc. Ganad. Urug.* 30. 26-45. [English summary.] 1931

Eosinophilic inclusion bodies are described in preparations of vesicle epithelium

from g. pigs and cattle infected with the virus of F. & M. disease.—W. M. HENDERSON.

FRENKEL, H. S. (1947.) La culture du virus de la fièvre aphteuse sur l'épithélium de la langue des bovidés. [**Tissue culture of foot and mouth disease virus using the tongue epithelium.**]—*Bull. Off. internat. Epiz.* 28. May. 155-162. 1932

A method and apparatus are described by which the epithelium of the tongue of cattle may be stripped off and used for tissue culture of the virus. The method has been used with success for the growth of the virus in sufficiently large quantities to be used for the preparation of adsorbate vaccine and F. considers it has great possibilities for the large-scale preparation of such vaccine.—M.C.

FRENKEL, H. S., & FREDERIKS, H. H. J. (1949.) **Cultivation of foot-and-mouth disease virus in explanted epithelial tissue of the bovine rumen.** [**Correspondence.**]—*Nature, Lond.* 164. 235-236. 1933

The authors report the successful use of epithelium from the non-papillated portions of the bovine rumen for the *in-vitro* cultivation of F. & M. disease virus. The method used is the same as that described by Frenkel [see preceding abst.] for cultivation of the virus in bovine tongue epithelium. In the first attempt using ruminal tissue 28 passages were made and then the virus became inactive for some unexplained reason. In a second attempt eight passages have been completed, the final one giving a titre of 1:450,000. Two litres of this culture were obtained using tissue from two rumens, one rumen yielding about 75 g. of epithelial tissue. The authors claim that the yield of virus from one rumen culture equals the yield from four tongues from inoculated cattle. They recommend the use of this method of virus production for vaccine preparation as it

has the advantages of having no mass infection of living animals, great reduction in cost of virus production, simplification of the method of preparation of the vaccine and, as a result, a lowering of the cost of the vaccine thus favouring a wider application.—W. M. HENDERSON.

UBERTINI, B. (1947.) L'importanza della rapida identificazione dei tipi di virus nella preparazione del vaccino anti-aftoso. [**The importance of the rapid typing of strains in preparation of F. & M. disease vaccines.**]—*Zooproflassi*. 2. No. 11. pp. 16-27. 1934

The author stresses the importance of keeping a check on the strains being used in routine vaccine production. This is important from two points of view, firstly, more than one type may be responsible for the disease in the field and secondly, passage of strains in the vaccine production centre is always open to the risk of accidental infection. The complement-fixation test is used for routine checking of strains in the author's Institute. The technique employed is described.

—W. M. HENDERSON.

WEHMEYER, P. (1948.) Etude physico-chimique du sang et du sérum de bœufs vaccinés contre la fièvre aphteuse. [**Physico-chemical study of the blood serum of cattle immunized against foot and mouth disease.**]—*Rev. Immunol. thérap. antimicrob.* 12. 239-243. 1935

The protein concentration, gelatinization following the addition of formalin, viscosity and electrophoretic pattern of serum and the cell volume and sedimentation rate in blood have been examined from non-vaccinated cattle and from cattle vaccinated with an aluminium hydroxide F. & M. disease vaccine. This report is described as being preliminary and little difference is noted between the sera of the two groups beyond increases in total serum protein and serum globulin after vaccination. [The reported increase in globulin is based on electrophoretic analyses and reference is made to the appearance at the same time of an additional component near the gamma globulin peak. If this is so, the labels of the "non-vaccinated" and "vaccinated" serum in an accompanying sketch of

the electrophoretic pattern appear to have been transposed.]—W. M. HENDERSON.

LIEOU, Y. C. (1948.) **Carriers of rabies virus.**—*Chinese Med. J.* 66. 694-699. [Abst. in *Trop. Dis. Bull.* 46. 729-730. (1949), copied *verbatim*. Signed: G. STUART.] 1936

The author defines a carrier of rabies virus as "one who, with all the external signs of good health bears, nevertheless, in his organism a virus, detectable either by experimental inoculation or by microscopical examination." He divides carriers into four categories, according to localization of virus, *viz.*, in the brain, blood, saliva and subcutaneous tissues. The following paragraphs summarize his presentation of the subject:—

Virus carried in the brain.—Experimentally virus, after intracerebral inoculation, may lie latent, unaltered and without causing symptoms, for long periods (90-302 days respectively) in the brain of the fresh water turtle and land tortoise—cold-blooded animals refractory to rabies—and for shorter periods, up to 23 days, in pigeons—warm-blooded and relatively insusceptible to rabies [probably because of their high body temperature] (phenomenon of permanence). In dogs, inoculated subdurally, the virus may disappear from the brain for several days and then reappear (eclipse phenomenon). Under natural conditions the virus may remain dormant, for months, even years, in the brain of man, especially in the inadequately treated until suddenly awakened to action by stimuli such as trauma, cold or emotional upset.

Virus carried in the blood.—Experimentally the presence of virus in the blood of rabbits, 4-5 days after subdural inoculation, has been demonstrated by MARIE & URBAIN [*V.B.* 3. 247]. The present author also has shown that rabbits inoculated intraperitoneally may early contain virus in their blood and remain unaffected throughout a four months' period of observation. In nature, as stated by REMLINGER and by KONRADI, a female animal can transmit rabies to its offspring by way of the placental circulation. [These findings and observations are not generally accepted. Many workers on rabies consider

that the blood is non-infectious in man and in experimental animals and that virus cannot be conveyed to the foetus. Other workers believe that, after experimental inoculation, the blood rarely proves infectious, i.e., rarely contains virus; in positive findings the appearance of virus is but momentary.]

Virus in the saliva.—Animals generally transmit rabies by their saliva; this group of carriers is, therefore, most important from a practical point of view. A dog in the incubation period of the disease may, when apparently healthy, convey rabies by its bite, inasmuch as it may have virus in its salivary glands as early as 10-11 days before showing first symptoms. [How long virus is present in the saliva before the animals becomes outwardly ill is not established, but it is probably 2-5 days.] Recovery from rabies is relatively frequent in adult birds. Should a dog recover, it remains a carrier of virus. [According to REMLINGER the saliva of a dog remains virulent five days after recovery. Most workers, who have studied experimental rabies in dogs, have noted apparent recovery from paralytic disease. There is no record, however, of isolation of rabies virus from the saliva of a naturally infected dog that eventually recovered. Moreover, with the possible exception of the dog reported by REMLINGER (1907), it has been impossible to isolate the virus from the saliva of experimentally infected dogs that did not succumb. It should be noted that REMLINGER's findings were in respect of a dog which had been inoculated with fixed virus and that other investigators have failed to isolate virus from the salivary glands of dogs infected with fixed virus.]

Virus carried subcutaneously.—All individuals, who receive anti-rabies vaccine prepared according to the method of PASTEUR, HOEGYES or FERMI, must at some time during the course of treatment harbour virus subcutaneously. In dogs immunized with wholly inactivated vaccine, rabies virus, on later introduction by a biting animal, rapidly disappears; such immunized dogs do not, therefore, become virus carriers. [Unlike all other known vectors, which transmit the disease for a limited period of time and then die of the

infection, the vampire bat is capable of transmitting rabies over periods of six months as a symptomless carrier. These bats are "carriers," in that they are infected with the virus and transmit it to others by biting—their saliva is infected—and yet are sufficiently resistant to hold it in check in their tissues without developing the disease and succumbing to it. In rabies, then, as in other infections, their exist healthy carriers of the virus which are capable of transmitting the virus and, consequently, the disease.]

WRIGHT, J. T., & HABEL, K. (1948.) **A comparison of antigenicity and certain biological characteristics of 6 substrains of Pasteur fixed rabies virus.**
—*J. Immunol.* **60**, 503-515. 1937

Differences between six substrains of Pasteur fixed virus were demonstrated by the behaviour of the strains in normal mice, by variations in the lesions produced and by the varying ability of the different strains to overcome a given degree of immunity in vaccinated mice. Antigenic differences were shown by the intracerebral cross-immunity test and were confirmed by the viral cross-neutralization test, the intramuscular cross-immunity test, and by complement fixation. The six strains originated from Paris and were probably once identical in their behaviour: their subsequent history varied and each strain had evolved individual characteristics.

The ability of a virus substrain to overcome a given degree of immunity appeared to be independent of virulence, incubation period, or antigenicity in normal mice. For instance, of three substrains with the same virulence and incubation period and with quite similar antigenic structure, one strain possessed 100 times the ability of either of the others to overcome the immunity produced by vaccines to all three strains. Ability to overcome immunity may thus be a particularly sensitive characteristic which can be used to differentiate viruses of rabies of the same ancestry but of differing biological evolution.—E. G. WHITE.

DANBOLT, N. (1949.) "Budeieknuter" en para-vaksinal infeksjon fra "kukopper"

til mennesker. [**"Milkers' nodules," a para-vaccinal infection from "false" cowpox.**—*Tidsskr. norske Lægeforen.* 69. 177-179. [Abst. in *Bull. Hyg., Lond.* 24. 579. (1949), copied *verbatim*. Signed: CLAUDE LILLINGSTON.] 1938

"False" cowpox is so common in Norway that, according to Professor Flatla of the Veterinary High School, some 10,000 cases were registered yearly apart from the doubtless numerous cases in cattle, sheep, goats and horses not seen by veterinary surgeons. But genuine cowpox or vaccinia is very rare in Norway. Norwegian country doctors are familiar with "false" cowpox, "dairymaids' nodules" or "milkers' nodules," which are, as a rule, easily recognized and are characterized by fairly firm, bluish-red nodules on fingers and hands. The incubation period is 8-10 days, and the condition may last several weeks with, in a few cases, scab formation and ulceration. Vaccination against smallpox is no preventive of this condition. The duration of the immunity it confers is unknown.

The occasion for the publication of this paper by Professor Danbolt was an outbreak in the autumn of 1948 in many parts of Eastern Norway of "milkers' nodules" associated with such violent allergic reactions that they led to admission to the Skin Department of the Riks-hospital in Oslo. Details are given of three of these cases. In one case there was a diffuse erythema with œdema of the skin of the hands and arms. Another case presented a rash like that of erythema multiforme. In the third case there was a general macular rash. Superficial vesicles, to some extent confluent, left blood-stained purulent scabs. The death of this patient was probably due to activation of an old meningeal disease with the formation of a cyst the size of a walnut. As sulphonamides and penicillin have no effect on "false" cowpox, their prescription is indicated only when this condition is complicated by a secondary pyogenic infection.

FENNER, F. (1949.) **Mouse-pox (infectious ectromelia of mice): A review.**—*J. Immunol.* 63. 341-373. [Author's conclusions slightly modified.] 1939
This review makes it clear that besides

its intrinsic interest as a natural virus disease of mice, mouse-pox is worthy of investigation as a member of the mammalian pox virus diseases, and it also provides a good laboratory model for the study of several problems of general biological interest. It is an excellent model of smallpox and the human exanthems, and can be used to study problems of pathogenesis, immunity and chemotherapy in these diseases. Preliminary experiments have indicated that it provides a useful method of investigating problems of virulence and infectivity in viruses, although it is likely that its mode of spread limits the possibility of making generalizations concerning infectivity. Clear evidence of the variations of susceptibility with age has been obtained, and mouse-pox provides a better model for general studies on this subject than do the neurotropic viruses in mice.

The antigenic constitution of ectromelia virus is almost completely unknown. Comparative antigenic studies of vaccinia and ectromelia virus might provide useful information on the evolution of the mammalian pox viruses and could be carried out by using the techniques developed by Craigie, Rivers and Smadel for the study of vaccinia virus. Study of the hæmagglutinin is obviously desirable, especially in view of its inhibition by solutions of protamine and McLean's observation on protamine neutralized vaccinia virus infection in rabbits.

The predictable course of experimental epizootics of mouse-pox, the existence of several strains of virus with different degrees of virulence, and the availability of a simple method of antibody titration make it an ideal disease for the experimental study of the epidemiology of virus diseases.

Although it has not yet been used in such studies, mouse-pox offers many advantages for experiments on the chemotherapy of the pox diseases. It is a natural disease of a small laboratory animal, and depending upon requirements the virus can be inoculated in the pad of the foot, to simulate the natural disease, or it may be inoculated intraperitoneally, so that the great majority of the inoculated mice die

within five days, or the effect of the drug on the naturally spreading disease can be studied under controlled conditions.

LANNIE, F., & BEARD, J. W. (1948.) **The mechanism of egg-white inhibition of hemagglutination by swine influenza virus.**—*Proc. Soc. exp. Biol., N.Y.* 68. 442-448. 1940

The capacity of egg-white to inhibit hæmagglutination by swine influenza virus is determined by the capacity of an unidentified egg-white component to combine with virus and thus obstruct the reaction of virus with fowl erythrocytes. This inhibitor is rapidly inactivated by highly infectious virus, but not by non-infectious old formolized vaccine virus. Inactivation of inhibitor is suppressed by convalescent anti-influenza swine serum.—W. R. BETT.

FLICK, J. A. (1948.) **Use of formalin-treated red cells for the study of influenza A virus hemagglutinating activity.**—*Proc. Soc. exp. Biol., N.Y.* 68. 448-450. 1941

Human formalin-treated red blood corpuscles retain their ability to react with influenza A virus just like untreated RBC. The technique of preparing formolized cells is described. Although such cells possess certain disadvantages: (because of cohesiveness they cannot be drawn into a pipette without previous mixing with a liquid diluent), they possess negligible buffering power; without a buffered diluent it is difficult to maintain a suspension at a constant pH. The disadvantages, however, are outweighed by the advantages: formolized cells pack more quickly and firmly on centrifugation, so that greater accuracy is obtained in preparing suspensions and supernatant solutions are more completely removed. A stock suspension can be used for months with assured constancy of concentration and reactivity.—W. R. BETT.

FLICK, J. A., SANFORD, B., & MUDD, S. (1949.) **The effect of salt concentration on the interaction of influenza A virus and erythrocytes.**—*J. Immunol.* 61. 65-77. 1942

The extent of adsorption of influenza A virus on formolized human erythrocytes is

related to the sodium chloride concentration of the system over a limited range; at a salt concentration of about 0.9% it is maximal and very slight at low salt concentrations. The amount of cell receptor substance inactivated by virus at 37°C. is related similarly to the concentration of sodium chloride.

Adsorbed virus is eluted much more readily by salt-free water at 4°C. than by physiological saline solutions.

—NESTA DEAN.

BENNETT, I. L., Jr., WAGNER, R. R., & LEQUIRE, V. S. (1949.) **The production of fever by influenzal viruses. II. Tolerance in rabbits to the pyrogenic effect of influenzal viruses.**—*J. exp. Med.* 90. 335-347. 1943

Initial injection of the PR8 strain of influenza A, the Lee strain of influenza B, or the "B" strain of Newcastle disease virus produces tolerance for 11 days to the fever-producing effect of homologous virus injected on the following day. These viruses confer tolerance to the pyrogenic effect of heterologous strains in an order corresponding to their position in Burnet's "receptor gradient." Heated viruses confer tolerance in proportion to hæmagglutinin survival.—W. R. BETT.

CHU, C. M. (1948.) **Agglutination of red blood cells of different animal species by influenza and Newcastle disease viruses.**—*J. Hyg., Camb.* 46. 239-246. 1944

Heated influenza viruses and purified Newcastle disease virus acquire an apparently increased hæmagglutination titre against ox red blood cells, because of diminished eluting power.—W. R. BETT.

CHU, C. M. (1948.) **Inactivation of hæmagglutinin and infectivity of influenza and Newcastle disease viruses by heat and formalin.**—*J. Hyg., Camb.* 46. 247-251. 1945

The adsorbing and eluting phases of influenza (Lee and PR8) hæmagglutinin can be dissociated by heating at critical temperatures. Dissociation cannot be obtained with Newcastle disease virus. Formalin in low concentrations inactivates both N.D.V. and Lee virus without impairing their hæmagglutinating activity or "enzymic" function.—W. R. BETT.

DAVENPORT, F. M., & HORSFALL, F. L., JR. (1950.) **Further studies on the associative reactions of pneumonia virus of mice (PVM) and influenza viruses. Combination with various animal tissues and adsorbents.**—*J. exp. Med.* **91**, 53-64. [Authors' summary copied *verbatim*.] **1946**

Tissue particles from a wide variety of animal tissues possess the capacity to combine with PVM. Various adsorbents also combine with the virus. Elution of PVM from combination with either tissue particles or adsorbents can be achieved by appropriately altering the ionic environment. Influenza viruses also are adsorbed on and eluted from adsorbents under similar conditions. Reasons are presented for thinking that combination of PVM with tissue particles results from the action of adsorptive forces between virus and tissue particles.

RADELEFF, R. D. (1949.) **Clinical encephalitis occurring during an outbreak of vesicular stomatitis in horses.** — *Vet. Med.* **44**, 494-496. **1947**

In an outbreak of a vesicular disease in thoroughbred horses in Texas, diagnosed as vesicular stomatitis, two mares and a new-born foal developed clinical signs of encephalitis without the appearance of vesicular lesions. Both the mares recovered and no material was collected from the foal, which died, so no definite incrimination of vesicular stomatitis virus as the cause of the encephalitis could be made. R. suggests, however, that it may have been the cause in view of the similarity between the clinical picture of the encephalitis in these cases and that produced experimentally in horses injected intracerebrally with the virus.

—W. M. HENDERSON.

VERLINDE, J. D. (1947.) **De vergelijkende histopathologie van de niet-etterige ontstekingen van het centrale zenuwstelsel. [The comparative histopathology of the nonpurulent inflammations of the central nervous system.]** — *Verhandel. Inst. Prevent. Geneesk.* **6**, 88. [Abst. in *Biol. Abstr.* Sect. F. **23**, No. 2. p. 19. (1949), copied

verbatim. Signed: J. D. VERLINDE.] **1948**

A histological, and partly experimental study of the different forms of encephalitis in animals in Holland, with special reference to their comparative pathology. It cattle, pigs, dogs, cats and guinea pigs encephalitis was found in which the gray matter, especially of the midbrain, the brain stem and the bulb, is affected. Besides this, forms of postinfectious encephalitis occur which correspond histologically to the leuko-encephalitis in man, the myelincolastic character, however, being less distinct than in man. Perhaps the latter can be explained by the fact that most of the animals are killed shortly after the clinical diagnosis of encephalitis, often even before, when the demyelination usually cannot be shown. On the other hand, the largest amount of demyelination is found in dogs, which as a rule are not killed so soon. The importance of the encephalitis of animals for an understanding of the pathology in man is explained. The diseases whose causative agents can produce encephalitis in man as well as in animals are further examined. In these cases a mutual contamination would be possible. Besides, there is the possibility that new viruses may occur, which differ slightly from the types already known, either immunologically or pathogenically, and that suddenly; or by gradual adaptation, a virus pathogenic for man could be generated from a related virus occurring in animals. In regard to the pathogenicity of the polioencephalitides, the importance of the so-called preparing catarrhal inflammations which stimulate the penetration of the virus into blood and lymph vessels and nerves is pointed out. On the basis of the author's own investigations on idiopathic encephalitis in dogs, attention is drawn to the activating influence of an auto-intoxication by products of the metabolism or of bacterial toxins on virus invasion. The cause of postinfectious encephalitis is not known, but it can be shown experimentally that the causative agent of the postinfectious distemper encephalitis in dogs must be the virus of the primary disease, in combination, however, with toxic materials. These

may be products of metabolism or bacterial toxins, as with polio-encephalitis (idiopathic encephalitis in dogs), but an anaphylatoxin may also be possible. In rabbits inoculated intracerebrally with neurovaccine and a certain amount of vaccine-immune serum, a local softening in the brain was found, which might indicate the existence of anaphylatoxin. The different forms of encephalitis in man and animals are classified in a scheme, consisting of three groups, which do not show a strongly marked difference, as there are intermediate forms. (A) Polio-encephalitis with irregularly disseminated focal lesions, especially in places of preference. The lesions consist of mesodermal and glial reactions and necrosis of nerve cells. The virus is supposed to move along the peripheral nerves to the central nervous system. To this group belong polimyelitis in man and poliomyelitis-like diseases in animals, Borna disease, epidemic encephalitis, enzoötic encephalitis of cattle, rabies, idiopathic encephalitis in dogs and cats and, as intermediate forms to the next group, Aujeszky's disease and virus B. (B) More disseminated forms of polio-encephalitis with mesodermal reaction, glial nodules and a somewhat less severe attack of nerve cells. The viruses spread hematogenously. To this group belong equine encephalomyelitis, Japanese B, St. Louis and Russian tick-borne encephalitis, louping ill, the Moussu-Marchand disease of horses, enzoötic paralysis of sheep and, as intermediate form to the 3d group, fowl plague. (C) Leuko-encephalitis with disseminated lesions, in the typical cases consisting of slight mesodermal and strong (perivascular) cuffing of glia cells and demyelination. The viruses spread hematogenously and are organotropic with a relatively small affinity for the nervous system. To this group belong the post-infectious encephalitis, diffuse and disseminated sclerosis. The classification of some animal diseases, as encephalitis in the course of cattle plague, infectious anemia, influenza and infectious diseases of the respiratory tract in horses and pigs, cannot yet be stated with certainty as they have not yet been examined sufficiently. Possibly they belong to group C, but

perhaps they may be related more closely to fowl plague. Dog distemper encephalitis and swine plague encephalitis show many characteristics of a true leuko-encephalitis.

OVERMAN, J. R., & FRIEDEWALD, W. F. (1950.) **Multiplication of certain neurotropic viruses in the rabbit eye following intraocular inoculation.**—*J. exp. Med.* 91. 39-51. [Authors' summary copied verbatim.] 1949

Lymphocytic choriomeningitis [LCM] virus and Semliki Forest virus [SFV] readily multiply in the rabbit eye following inoculation into the vitreous. Less than 10 mouse LD₅₀ of LCM virus was sufficient to induce multiplication in the eye, whereas, approximately 1,000 LD₅₀ of SFV was required to initiate infection.

Both viruses multiplied in the rabbit eye as an inapparent infection. Little or no virus could be recovered from the optic nerves or brains of the rabbits, although virus was present in high titer in the eyes. The animals showed no signs of illness other than a transitory fever.

Large amount of SFV induced a severe iritis followed by corneal opacity. This reaction appeared to be due to "toxic" properties of the virus. No ocular reactions have been observed with LCM virus other than a mild transitory hyperemia. The yield of virus from the eye following inoculation of large amounts of SFV was less than when more dilute inocula were used.

Maximum multiplication of both viruses occurred about 48 hours after inoculation into the vitreous. SFV remained in high titer for about four days and thereafter could be recovered in variable amounts up to about five weeks after inoculation. LCM virus could be recovered in gradually decreasing amounts up to about three weeks after inoculation.

Serum - neutralizing antibodies appeared in high titer (neutralization index up to 3,000) following inoculation of SFV into the rabbit eye. However, only traces of antibody could be detected in extracts of the eyes.

SFV was obtained irregularly and in low titer from the aqueous humor follow-

ing inoculation into either the vitreous or anterior chamber. No significant difference in the virus content of the vitreous, an extract of the retinal cells, and an extract of the whole eye could be detected 48 hours after inoculation of SFV into the vitreous.

The Lansing strain of poliomyelitis virus failed to cause any detectable reaction in the rabbit eye and no evidence of multiplication of the virus was obtained in these experiments.

I. ZIEGER, W. (1948.) Ueber Erschöpfungskrankheiten der Pferde unter besonderer Berücksichtigung der infektiösen Anämie. [**Wasting disease of the horse and infectious anæmia.**]—*Dtsch. tierärztl. Wschr.* 55. 215-216. 1950

II. HORCHNER. (1948.) Ueber Erschöpfungskrankheiten der Pferde unter besonderer Berücksichtigung der infektiösen Anämie. [**Wasting diseases of the horse and infectious anæmia.**]—*Ibid.* 216-218. 1951

III. LUDWIG. (1948.) Ueber Erschöpfungskrankheiten der Pferde unter besonderer Berücksichtigung der infektiösen Anämie." [**Wasting diseases of the horse and infectious anæmia.**]—*Ibid.* 218-219. 1952

I., II. & III. A discussion between Ludwig who (*Dtsch. tierärztl. Wschr.* (1947) pp. 41-42) stated that the German military authorities had repeatedly refused to accept the diagnosis of infectious anæmia even where it was present in a large number of horses and two other former army veterinarians, Zieger and Hörchner, who deny that the military authorities ignored the existence of infectious anæmia in horses, but still think that most of the anæmias in horses were secondary to various respiratory diseases or to wasting disease caused by parasites, circulatory disturbances, or bacterial infections. In his answer L. gives the reasons for his diagnosis and confirms his general statements.—W. STECK.

HALLAUER, C., & MOOSBRUGGER, G. A. (1949.) Untersuchungen über das Virus der infektiösen Anämie der Pferde.

[**Research on the virus of equine infectious anæmia.**]—*Schweiz. Arch. Tierheilk.* 91. [Nov. Special No.]. pp. 28-41. [Abst. from German summary.] 1953

By adsorption on erythrocytes and elution, virus from infectious horse serum could be isolated, purified and probably concentrated. This method might prove useful for the production of antigen preparations.

Transmission and rapid passage in white mice produced a transmissible anæmia in mice. It was not possible to prove that this disease is identical with the disease of horses.

Transmission of the virus to chick embryos was unsuccessful.

It was not possible to determine definitely whether virus-specific haemagglutinins are present in the serum of infected horses.

In the serum of an acute case a strong auto/and iso-hæmolysin was found and isolated. It is only active in the presence of complement. After a febrile attack no complement can be detected in the serum.

—W. STECK.

BURGI, O. (1949.) Ansteckende Blutarmut, Virusanämie der Pferde. [**Equine infectious anæmia.**]—*Schweiz. Arch. Tierheilk.* 91. [Nov. Special No.]. pp. 41-48. 1954

Infectious anæmia occurs regionally in Switzerland, more often in the chronic or latent than in the acute form. Transmission experiments with material from Switzerland and France were not always successful, North American virus proved to be more virulent. No characteristic clinical sign could be found. Treatment was unsuccessful. B. thinks that a similar clinical and pathological picture can be produced by infection with hæmolytic streptococci.—W. STECK.

FORTNER, J. (1948.) Die ansteckende Blutarmut der Einhufer in den Impfstoffwerken. [**Equine infectious anæmia in serum production institutes.**]—*Berl. Münch. tierärztl. Wschr.* May. 49-53. 1955

F. gives a general description of the disease, criticizes the view of Eberbeck

and others who doubted the existence of the disease, a view which influenced the attitude of the military authorities during the second world war. The disease has repeatedly been introduced into institutes for serum production and has caused considerable losses. To avoid these F. suggests a quarantine of four months and cross-transmission tests after two months (subcutaneous injection of blood crosswise between pairs of horses), clinical examination weekly, blood examination every fortnight, temperature taken three times daily. If as a result of the transmission of blood one horse is found positive, the other horse of the pair must also be eliminated.—W. STECK.

ROEHER, H., & STOEHR, P. (1949.) Der Kreuzinfektionsversuch zur Feststellung der ansteckenden Blutarmut als Quarantänemassnahme für Serumpferde. [**Cross infection in the diagnosis of infectious anæmia of serum horses.**] —*Mh. Vet.-med.* 4. 141-147. 1956

Quarantine was carried out as described by Fortner [see preceding abst.] Cross infection has proved to be useful. It is based on the sufficiently well established fact that superinfection does not take place in infectious anæmia. Fever may occur from unknown causes, but is not to be taken as a diagnostic sign of the disease.

Out of 126 apparently healthy horses, four were found to be carriers of the infectious anæmia virus. Anæmia need not be present in infectious anæmia.

—W. STECK.

EPSTEIN, B. (1948.) Anatomía patológica de la anemia infecciosa de los equinos. [**Pathological anatomy of equine infectious anæmia.** — *Rev. Med. vet., Montevideo.* 4. 808-817. 1957

A description of the histopathological changes encountered by E. in the dead animal. The changes were similar to those described in other countries. A variety of fixatives and stains were used to study the histology of the lesions.

—L. M. MARKSON.

DAUBNEY, R. (1948.) **Immunization against rinderpest by means of the goat-adapted virus.** — *Proc. 4th Internat.*

Congr. Trop. Med. Malar. pp. 1358-1365. 1958

The development of the goat-adapted virus as an immunizing agent in India since Edwards' first paper in 1927 is briefly reviewed. In 1937 Edwards' Mukteswar strain was obtained by D. and studied in Kenya. Kenya strains were also adapted to the goat, one of these was a stock strain which had been passaged in cattle at the laboratory for some 30 years. From this strain was derived what is now known as the K A G strain, the properties of which are described. Comment is made on the different experience in Africa as compared with India so far as spread of infection from cattle to goats is concerned. There has been no record of such spread in Africa. D. suggests that the reason may be that only strains well adapted to the goat have been used in Africa, whereas in India in the earlier days of the use of this agent some strains may have been used in the field after only a few passages in goats.

In East Africa goats have never been inoculated in the field as virus producers, a method which was in common use in India before the use of desiccated spleen tissue replaced blood as the vaccine material.

The experience gained with goat virus in Egypt in 1946 and 1947 is described.

—M.C.

GIBBONS, W. J. (1947.) **Contagious exanthema of cattle. (Contagious epithelioma, X-disease.)**—*Auburn Vet.* 3. 53-54 & 70-76. 1959

This is a discussion of two diseases, both of which have been referred to as X disease. One is the disease resembling rinderpest described by Olafson *et al.* [V.B. 17. 186] characterized by fever, dysentery, ulceration of the lips and transmissible by inoculation of blood. The other which is often referred to as hyperkeratosis has not so far been transmitted experimentally. It is of a chronic nature with salivation, ulceration of the mouth, tongue and stomachs and growth of wart-like granulations on the ulcerated areas. There is loss of hair and thickening of the skin. The possible relationship of the

disease to contagious vesicular exanthema of swine is suggested.—M.C.

GALLIA, F., RAMPAS, J., & HOLLENDER, L. (1949.) Laboratorní infekce encefalitickým virem. [Laboratory infection with an encephalitis virus (loup-*ing* ill).]—*Cas. Lék. ces.* 88. 224-229. [Abst. in *Bull. Hyg., Lond.* 24. 476. (1949), copied *verbatim*. Signed: D. J. BAUER.] 1960

In 1948 the authors isolated five strains of virus from material obtained during an epidemic of encephalitis in Czechoslovakia. Louping-ill virus was also handled in the laboratory. Some days after isolating the first strain of virus, one of the authors became ill with encephalitis. The case history is given in detail. The course was biphasic, with an intervening afebrile period of six days; recovery began after 20 days and was complete after 34 days. A strain of virus was isolated from serum taken on the first day of illness by the intracerebral inoculation of mice. Serum taken during convalescence contained neutralizing antibodies to this virus, and also to the strains of virus which had been isolated from the cases of encephalitis. In an addendum it is stated that the virus isolated from the patient was identified as louping-ill by neutralization with specific antiserum, while convalescent-phase sera from a number of cases of encephalitis contained neutralizing antibodies to louping-ill virus. It is concluded that louping-ill is endemic in Czechoslovakia.

EDWARD, D. G.F.F. (1949.) Tissue neutralization of louping-ill virus.—*Brit. J. exp. Path.* 30. 582-586. [Author's summary copied *verbatim*.] 1961

Louping-ill virus could not be demonstrated in 11 out of 30 (37 per cent.) brains, obtained from sheep which had succumbed to louping-ill after subcutaneous inoculation with virus.

A substance, capable of neutralizing virus *in vitro*, was found in the brains of some sheep infected by the subcutaneous route. It appeared to be identical with neutralizing antibody, and did not have the properties of a neutralizing substance, which had been described in the brains of mice infected with mouse poliomyelitis.

VERLINDE, J. D. (1949.) Congenitale cerebellaire ataxie bij katten in samenhang met een vermoedelijke virusinfectie bij de moeder gedurende de graviditeit. [Congenital cerebellar ataxia in kittens probably connected with a virus infection of the mother during pregnancy.]—*Tijdschr. Diergeneesk.* 74. 659-660. [Abst. from English summary.] 1962

In two cats with congenital cerebellar ataxia considerable changes in the histological structure of the cerebellum were found. An irregular distribution of the Purkinje cells throughout the molecular layer was most striking. The mother had had a virus infection, probably infectious leucopenia or agranulocytosis, during the first weeks of pregnancy. A relation between the changes and the virus disease of the mother is suggested, in analogy to congenital defects in children following German measles in the mother during the first months of pregnancy.

WEISS, E. (1950.) Multiplication of the agent of feline pneumonitis in the yolk sacs of dead chick embryos.—*J. infect. Dis.* 86. 27-32. [Author's summary copied *verbatim*.] 1963

The agent of feline pneumonitis was cultivated for 20 passages in the yolk sacs of dead chick embryos. The strain obtained from the 17th passage appeared identical to the original strain with respect to morphology, virulence for chick embryos and mice, and antigenicity. The rates of growth in living and dead embryos were very similar, although a somewhat higher titer was reached in living embryos.

FABRICANT, J. (1949.) Studies on the diagnosis of Newcastle disease and infectious bronchitis of fowls. I. The hemagglutination-inhibition test for the diagnosis of Newcastle disease. II. The diagnosis of infectious bronchitis by virus isolation in chick embryos.—*Cornell Vet.* 39. 202-220 & 414-431. 1964

I. The specificity of the hæmagglutination-inhibition test for the diagnosis of Newcastle disease was confirmed. Evidence is also presented which indicates that the hæmagglutination inhibitors in

the serum reach a positive level sooner after exposure to the virus than is the case with serum neutralizing antibodies. The hæmagglutination-inhibition titre reached a positive level from two days before to five days after the appearance of respiratory symptoms. Birds kept for 23 months remained positive to both the hæmagglutination and serum neutralization tests.

II. The virus of infectious bronchitis can be isolated and identified by its ability to produce certain changes, which appear to be specific, in chick embryos, *viz.* decrease in the size of the amnion and in the amount of amniotic fluid, a curling of the embryo and a marked decrease in embryo size.

This virus isolation technique was successful in 24 out of 26 cases with typical symptoms. The serum neutralization test was not found to be sufficiently reliable. Hopstad (1945) was unable to produce hæmagglutination with infectious bronchitis virus.—D. LUKE.

DOYLE, T. M., & WRIGHT, E. C. (1950.)
An inactivated vaccine against Newcastle disease.—*Brit. vet. J.* 106. 139-161. 1965

The need for an inactivated vaccine which would confer a durable immunity for use in countries such as Gt. Britain, as an adjunct to a policy of eradication, prompted a study of the use of crystal violet in the preparation of such a vaccine. The tissues of chick embryos which had died within 72 hours of inoculation of eggs which had been incubated for ten days, formed the basis of the vaccine; the egg yolk and the allantoic fluid was also included but the albumen was discarded. To each 800 g. of this material 200 ml. crystal violet-ethylene glycol (1:400) was added. The mixture was incubated for 36 days at 37.5°C. and after removal from the incubator the mixture was diluted so that the dye content did not exceed 0.00005%. A number of strains of virus were used, but in most of the experiments the "Herts" and "Turkey" strains were used.

Preliminary tests indicated that the intraperitoneal route of inoculation was unsatisfactory and the intramuscular route

was adopted for general use. A series of experiments were carried out to test the time necessary for inactivation of the virus, the interval after vaccination before immunity is developed, the efficacy of immunity against infection by contact and by inoculation, the duration of the immunity, the response of chickens of various ages to immunization, effect of storage on the vaccine, the titre of virus neutralizing antibodies in vaccinated fowls and the absence of the hæmagglutination-inhibition reaction in vaccinated fowls.

There are also notes on the nature of the effect produced by crystal violet on the virus and on the use of crystal violet in preparation of a vaccine against the other major epidemic disease of fowls, namely fowl plague.

The results of the numerous experiments are tabulated.

The vaccine is safe in use, its keeping qualities are good as potency was not diminished after five months' storage at 2-4°C., immunity is established about the seventh day after vaccination and is durable as it persists for at least 12 months. The vaccine did not appear to have any adverse effect on egg production, nor did it cause any reaction in the vaccinated fowls.—M.C.

DINTER, Z. (1949.) Weitere Untersuchungen über das Virus N. [**Further research on virus N.**]—*Tierärztl. Umsch.* 4. 229-231. 1966

Virus N, isolated from nine diseased fowls in one flock, resembles the viruses of fowl plague and of Newcastle disease. It differs from those viruses by not being able, in artificial infection, to cause symptoms in chickens or adult fowls. When inoculated into chick embryos it causes infection in 100%, with the death of the embryos; the pathological findings are characteristic also of fowl plague, and there is marked hæmagglutination by the embryonic fluids. In experimentally infected fowls, although free from symptoms, antibodies against the virus developed, as proved by inhibition of hæmagglutination. There was no serological cross reaction between the N-virus and the viruses of fowl plague and

Newcastle disease, nor any cross immunity in neutralization tests.—A. MAYR-HARTING.

TRENCHI, H., SZYFRES, B., & ABARCON, D. (1948.) Laringotraqueítis infecciosa. Su comprobación en el Uruguay. [**Laryngo-tracheitis in fowls.**—*Rev. Med. vet., Montevideo*. 4. 825-828. 1967

An outbreak in Uruguay, identified as avian infectious laryngo-tracheitis is described.

SILVA GOYTIA, R. (1948.) Ornithosis (psittacosis) en Mexico. Incidencia en palomas y gallinas. [**Ornithosis (psittacosis) in Mexico. Incidence in pigeons and chickens.**—*Rev. Inst. Salubridad y Enfermedades Trop. Mexico*. 9. 231-234. [English summary slightly modified.] 1968

Serological evidence of ornithosis-like infection in domestic Mexican pigeons is presented. Among the group of 100 pigeons and 120 chickens used for the experiment, only 1% of the sera of the pigeons examined showed complement-fixing antibodies for ornithosis. Attempts to isolate the virus failed.

HUDSON, J. R. (1950.) **The recognition of tick-borne fever as a disease of cattle.**—*Brit. vet. J.* 106. 3-17. 1969

A mild febrile disease of cattle characterized by a sudden fall in milk yield in dairy cows and by a temperature reaction lasting 1-5 days has been investigated.

The disease is readily transmitted to healthy cattle experimentally by inoculation of blood. After an incubation period of 4-12 days there is a rise of temperature lasting 2-8 days.

The causal agents appear to be bodies resembling those found in tick-borne fever of sheep, which are present in the leucocytes and can be demonstrated in Giemsa stained blood films.

The symptoms in experimentally infected cattle consisted of a sharp rise of temperature to as high as 106°F., some dullness and an increased respiratory rate. Appetite and rumination were not affected. A feature of the disease is the mildness of the symptoms as compared with the degree of temperature reaction. No deaths

occurred, but two of the inoculated cattle were killed and examined P.M. Apart from a slight enlargement of the malpighian corpuscles of the spleen, no macroscopic lesions were found. Microscopic examination was made of sections of liver, kidney, spleen, lungs, lymph nodes, pancreas, adrenal glands and abomasum and the changes found are described.

The white cell counts of the experimental animals during the course of the infection are described.

The causal organism is seen in the granulocytes, metamyelocytes and monocytes during and for a few days after the rise of temperature and reappears during second and later temperature rises when such occur.

They resemble very closely *Rickettsia canis* and H. is of the opinion that there is no doubt that they are rickettsiae.

Sheep and goats, as well as cattle, were susceptible to experimental infection, but neither rabbits, mice, g. pigs nor ferrets could be infected. Immunity to re-infection and cross immunity between the cattle organism and that of tick-borne fever of sheep have been studied. The possible effect of the disease on the course of other infections is discussed.—M.C.

SHEPARD, C. C. (1947.) **An outbreak of Q fever in a Chicago packing house.**—*Amer. J. Hyg.* 46. 185-192. 1970

An outbreak of more than 30 cases of Q fever occurred in August, 1946, amongst men working in a sheep and calf killing department of one of the large meat packing firms of Chicago. Up to this investigation only one naturally occurring case had been reported in America before 1946. The causative organism, *Rickettsia burneti*, had, however, been isolated from ticks in several parts of the U.S.A.

Detailed data were obtained about the work of the men affected and it was concluded that infection was most likely to occur from the spattering of blood, as those affected all worked on the sheep and calf-dressing and killing floor. None of the 33 cases diagnosed were seriously ill, only four being admitted to hospital. The majority were treated separately by their own physicians, who had mostly diagnosed

pneumonia or influenza. The affected workers appeared to have developed no immunity, for most of them had worked for many years in the same slaughter house, one as long as 42 years and another for 35.

Out of 81 men employed on the killing floor, 33 cases of Q fever were found, chiefly by means of the complement-fixation test.

Out of 19 men employed in washing carcasses and handling the viscera, 15 or 79% were infected. It was not definitely confirmed whether sheep or calves were the source of infection, but it was noticeable that no cases occurred among those workers who handled live animals only.

—D. S. RABAGLIATI.

See also absts. 1973 (antigens of rickettsia and mumps virus); 1979 (influenza virus); 2130 (F. & M. disease, institute); 2146 (electron microscopy and viruses); 2155 (Report, W. Australia).

IMMUNITY.

- I. COONS, A. H., & KAPLAN, M. H. (1950.) **Localization of antigen in tissue cells. II. Improvements in a method for the detection of antigen by means of fluorescent antibody.**—*J. exp. Med.* 91. 1-13. [Authors' conclusions copied *verbatim*. For Part I, see V.B. 13. abst. 1636. 1971

- II. KAPLAN, M. H., COONS, A. H., & DEANE, H. W. (1950.) **Localization of antigen in tissue cells. III. Cellular distribution of pneumococcal polysaccharides types II and III in the mouse.**—*Ibid.* 15-29. [Authors' summary copied *verbatim*.] 1972

- III. COONS, A. H., SNYDER, J. C., CHEEVER, F. S., & MURRAY, E. S. (1950.) **Localization of antigen in tissue cells. IV. Antigens of rickettsiae and mumps virus.**—*Ibid.* 31-38. [Authors' summary copied *verbatim*.] 1973

I. Improvements in a method for the specific microscopic localization of antigen in tissue cells are described. This method employs antibody labelled with fluorescein isocyanate as a histochemical stain, the specific antigen-antibody precipitate being made visible under the fluorescence microscope.

Two isomeric series derived from nitrofluorescein are described.

II. The cytological distribution of the pneumococcal polysaccharides, types II and III, was followed in the tissues of the mouse.

The most constant and striking concentrations of these polysaccharides were found in the cells of the reticulo-endothelial system, the ordinary capillary endothelium, and fibroblasts throughout the body. In addition, polysaccharide was

detected in monocytes and lymphocytes, hepatic cells, cardiac and smooth muscle cells, uterine epithelium, and in steroid-forming cells in the adrenal cortex, testis, and ovary.

Studies of the persistence of polysaccharide, type III, in the tissues were carried out after an injection of 4.0 mg. The polysaccharide remained for at least 75 days in the macrophages of lymphoid organs, the Kupffer cells of the liver, the interstitial macrophages in the myocardium, the lung septal cells, the capillary endothelium, and the renal glomerulus. After a single injection of 8 mg., it persisted for at least six months in the macrophages of the spleen, liver, and heart and in the endothelium of peritubular capillaries in the kidney.

The smallest dose of polysaccharide which produced detectable amounts in any cells 24 hours after injection was 0.03 mg.

The distribution of polysaccharide is compared with that of acid vital dyes and suspensoids, and the significance of its fixation in relation to its antigenicity and possible toxicity in mice is discussed.

III. Rickettsiae of epidemic typhus fever and Rocky Mountain spotted fever have been microscopically localized and identified in smears of exudates and tissue sections from infected cotton rats by means of homologous antibody labelled with fluorescein. Epidemic typhus has also been identified in smears from single infected human body lice.

Mumps virus antigen has been microscopically localized in the parotid of the experimentally infected monkey by the same method. The antigenic material,

probably active virus, was found in the cytoplasm of the acinar cells. Such infected acini were scattered irregularly throughout the gland. Some antigen could be seen in the lumens of the parotid ducts and small amounts were present in the cytoplasm of the epithelial cells lining the ducts.

PRESSMAN, D. (1949.) **The zone of localization of antibodies. IV. The in vivo disposition of anti-mouse-kidney serum and anti-mouse-plasma serum as determined by radioactive tracers.**—*J. Immunol.* **63.** 375-388. [Author's summary copied *verbatim*.] **1974**

Antisera were prepared in rabbits against kidney tissue and plasma from the Akm strain of mice and against ovalbumin. The globulin fractions of these sera were radioiodinated and injected into mice of several strains and into rats. It was found that radioactivity localized in the kidneys of the animals receiving the antikidney serum, but not in the kidneys of those receiving the antiplasma serum or anti-ovalbumin serum. Radioiodide also showed no such localization. This demonstrated that there was some material, presumably antibody molecules, in the antikidney serum and not in the control sera, that localized in the kidney.

The localization of antikidney serum was not strain specific since it took place in mice of other strains. It also took place on the injection of rats with the anti-mouse-kidney preparation.

The duration of the radioactivity in the kidneys of the mice receiving the antikidney serum was measured over a period of 54 days and the radioactivity carrier, presumably the radioiodinated antibody, had a half life of 20 days. Evidence was also found for the presence of a factor in the antikidney serum, presumably antibody to common antigens, which cross reacted with and localized in liver and spleen, but to a much lower extent than in kidney. In liver there was an initially rapid decrease in radioactivity followed by a subsequent slow decrease with a half life of 20 days. The long half life of the antibody in the kidney and liver was probably due to the inability of this tissue to metabolize the antibody.

The half lives of the radioactive carriers in other tissues were blood, 2.3 days; spleen, 2.6 days; and thyroid, 6.8 days.

WAKSMAN, B. H., & MASON, H. L. (1949.) **The antigenicity of collagen.** — *J. Immunol.* **63.** 427-433. [Authors' summary copied *verbatim*.] **1975**

In rabbits receiving rabbit collagen coupled to diazotized sulfanilic acid and in others receiving commercial gelatin similarly treated, there were formed no precipitating or complement-fixing antibodies to the homologous antigens after intravenous or intraperitoneal injection.

Normal human collagen, alone or coupled through benzidine with human serum globulin, did not give rise to demonstrable antibody formation in rabbits after intramuscular or intraperitoneal injection, even in the presence of the adjuvants of Freund and McDermott. In guinea pigs, following a single sensitizing injection, the same materials did not give rise to the symptoms of anaphylaxis upon intravenous injection. Rabbits injected with these materials show no consistent, significant pathologic change.

Complement fixation and precipitin tests of 19 sera of patients with lupus erythematosus, dermatomyositis, scleroderma, rheumatoid arthritis, and acute rheumatic fever failed to demonstrate the presence of antibodies against normal human collagen.

For purposes of purification, the collagen employed in these experiments was subjected to chemical and physical manipulations which may have affected adversely the demonstration of antigenicity.

FLEMING, D. S. (1949.) **Immunization with mixed bacterial antigens.** — *Amer. J. Med. Sci.* **217.** 345-354. [Abst. in *Bull. Hyg., Lond.* **24.** 546. (1949), copied *verbatim*. Signed: J. C. CRUICKSHANK.] **1976**

This is a detailed review of the literature relating to the use of a combination of antigens in immunization. Up to the early part of this century the prevailing view was that the "competition of antigens" would result in an adverse response

to some or all of the components of the mixture. The credit for developing the opposite view is given to CASTELLANI who, in 1915, described experiments in rabbits and field trials with TAB and cholera vaccines in man which led him to believe that there was no objection to the simultaneous injection of a number of antigens. Results obtained by RAMON and his colleagues from 1926 onwards satisfied these workers that combined injection of typhoid vaccine and of diphtheria and tetanus antigens was a sound procedure.

The reports now summarized comprise the results of numerous laboratory experiments and field trials. They include the types of immunization applicable specially to troops, such as TAB and tetanus inoculation, and those applicable to children, particularly diphtheria, pertussis and tetanus immunization. The general conclusion is that combined antigens are effective, that combination does not impair the rapidity or duration of response, and that the mixtures are not likely to increase the incidence or severity of reactions. The evidence relating to immunization against pneumococcal types suggests that for effective response, the number of different antigens in the mixture should be limited.

Although a good case has been made for combined immunization, research is necessary, as the author points out, to establish the proper size and number of inoculations and the interval between injections, to determine the advantages and limitations of alum precipitated and other antigens, and to study the problems of antigenic synergy.

This useful paper is itself a summary which cannot be further abstracted.

APTEKMAN, P. M., LEWIS, M. R., & KING, H. D. (1949.) **Tumor-immunity induced in rats by subcutaneous injection of tumor extract.**—*J. Immunol.* **63.** 435-440. [Authors' summary copied *verbatim.*] 1977

Ten successive subcutaneous injections at 2 to 3 day intervals of 0.5 to 1 ml. of an alcoholic extract of rat sarcomata was followed by the development of resistance to the growth of transplanted tumor grafts in 50 per cent. of the 94 rats treated in 19 litters of rats of the King A strain.

When the tumor-resistant rats were inbred, the percentage of tumor resistance that developed in response to this type of immunization increased, giving a total of 90 per cent., 83 per cent., and 85 per cent. in the various inbred generations of the SA, SB and SC lines respectively.

All 173 rats that developed resistance to tumor growth following injections of tumor extract remained resistant to the growth of all grafts of tumor tissue that they received during the several months (6 to 12) they were kept under observation.

The percentage of tumor-immunity increased from 50 per cent. of the 94 rats treated in the 19 litters of King A rats selected at random to 86.8 per cent. of the 145 rats treated in the 31 litters of inbred treated parents.

RICE, C. E., & AVERY, R. J. (1950.) **Studies of the conglutinating complement-absorption test. I. With constant complement.**—*Amer. J. vet. Res.* **11.** 98-104. 1978

In assessing the value of the conglutinating complement absorption test in certain antigen-antibody systems, the authors follow, with minor modifications, the technique of Hole & Coombs [see V.B. 19. 406].

The investigations are done in parallel to compare the hæmolytic complement-fixation test (using g. pig complement) and the conglutinating complement absorption test. In the latter a "non-hæmolytic" complement is used (usually from the horse) and the indicator system consists of sheep's cells and heated bovine serum (which contains a natural antibody against sheep's cells, and conglutinin; the latter causes a powerful aggregation of sensitized cells which have absorbed complement).

The two tests were compared using antibodies from horses and rabbits artificially immunized against mallein. No significant difference in titre between the two tests was observed. [Hole & Coombs demonstrated the superiority of the conglutination test in ponies experimentally infected with glanders.]

Pneumococcal antibodies from rabbits fixed complement equally in the two tests in the presence of the specific carbohydrate. Pneumococcal antibodies from

horses, however, failed to fix complement by either technique. In a study of 134 bovine sera suspected of containing brucella antibodies the conglutinating complement absorption test proved more sensitive in those cases which were positive to both tests. A few which were negative by the hæmolytic test, were anti-complementary in the conglutination test; no serum was anticomplementary in both tests.

Avian antisera have been shown to be unable to fix g. pig complement. Likewise in the conglutination test, horse complement was not fixed by fowl and turkey antisera against *S. pullorum*, nor fowl antisera against Newcastle disease virus and influenza virus. That antibodies were present in these birds was demonstrated by other means.—G. FULTON ROBERTS.

WALKER, D. L., & HORSFALL, F. L., JR. (1950.) **Lack of identity in neutralizing and hemagglutination-inhibiting antibodies against influenza viruses.** — *J. exp. Med.* 91. 65-86. [Authors' summary copied *verbatim*.] 1979

There is an exponential linear relationship between the quantity of influenza virus neutralized and the quantity of immune serum employed in *in ovo* neutralization. The slope of the neutralization line is extremely steep. The concentration of neutralizing antibody can be measured with considerable precision *in ovo* if the constant virus-varying serum technique is utilized.

The amounts of hemagglutination-inhibiting and neutralizing antibodies which are absorbed by a given quantity of influenza virus (PR8) were found to be predictable and the degree of reactivity of these two antibodies was shown to be directly related to the extent of immunization. It was demonstrated that there are marked discrepancies in correlation between antibody titers obtained by *in vitro* hemagglutination-inhibition and *in vivo* neutralization techniques and that neutralizing antibody is preferentially absorbed by a given quantity of virus. Inasmuch as the results were found not to be attributable to peculiarities of the techniques employed, it appears

that the antibodies measured by hemagglutination-inhibition *in vitro* and by neutralization *in vivo* are not identical.

SHRIGLEY, E. W., & MACULLA, E. S. (1949.) **Characterization of the agglutinating principle in chorioallantoic fluid responsible for the clumping of certain strains of *Staphylococcus aureus*.**—*J. Bact.* 58. 791-802. [Authors' summary and conclusions copied *verbatim*.] 1980

The properties of the principle in chorioallantoic fluid that agglutinates *Staphylococcus aureus* strains have been studied. This principle is not soluble in the common fat solvents, nor does it contain polysaccharide. It does contain nitrogen, and from its ultraviolet absorption curves, as well as from the fact that it is promptly destroyed by trypsin, one may conclude that the principle is protein in nature. The molecule is labile at temperatures over 41°C and requires an activation energy of 120 kilocalories per mole to inactivate its biological effect.

CARRYER, H. M., & CODE, C. F. (1950.) **Release of histamine during hemolytic reactions in the blood of rabbits.** — *Proc. Soc. exp. Biol., N.Y.* 73. 452-455. [Authors' summary copied *verbatim*.] 1981

Rabbits were sensitized by the repeated intravenous injection of washed sheep erythrocytes. After an appropriate period, addition of the washed sheep red cells to the rabbit blood *in vitro* produced prompt hemolysis. This *in vitro* hemolytic reaction in the rabbit blood was always accompanied by an increase in the histamine content of the plasma.

STAVITSKY, A. B., STAVITSKY, R., & ECKER, E. E. (1949.) **Loss of hemolytic-complement activity and of granulocytes following reinjection of an antigen into the rabbit.** — *J. Immunol.* 63. 389-407. [Authors' summary and conclusions copied *verbatim*.] 1982

The data obtained in this study support the following conclusions: (1) An abrupt and pronounced reduction of complement follows in 30 to 60 minutes after the reinjection of an antigen into a rabbit.

This decrease of complement-activity is probably due to fixation of complement by the complex of extracellular antibody and extracellular antigen *in vivo*. (2) A similar mechanism possibly is involved in the loss of complement in anaphylaxis and also in serum sickness. (3) The antigen-antibody union may also account for the loss of hemolytic complement in the course of various infectious diseases. (4) The granulocytopenia which generally accompanies the reduction of complement after the reinjection of an antigen appears to be related to anaphylactic and anaphylactoid reactions as well as to an *in vivo* antigen-antibody reaction. This reaction may however occur in the apparent absence of extracellular antibody. (5) The complement-reduction reaction is well suited for the study of antigen-antibody and hapten-antibody reactions *in vivo*. It may be used for the detection of extracellular antigen or antibody. It is highly specific and sensitive, apparently not affected by an excess of antigen or antibody, and may require little antigen for its appearance. At present, however, it is not a quantitative method. (6) The granulocytopenic reaction may be useful for the early detection of an anaphylactic type of sensitivity to a given antigen. (7) The granulocytopenic reaction has been observed often in the absence of any cardinal signs of anaphylactic shock. (8) Further study is required to determine the practical significance of the losses of antibodies, complement, and granulocytes during the early part of the so-called negative phase in immunization.

WAKSMAN, B. H. (1949.) **A comparison of the von Krogh formula (logistic function) and the method of probits as applied to hemolysis by complement.**—*J. Immunol.* 63. 409-414. Author's summary copied *verbatim*.] 1983

The von Krogh formula (logistic function) relating hemolysis, y , to amount, x , of complement, C' , describes a symmetrical distribution curve of red cell susceptibility to lysis when differentiated with respect to $\log x$. This curve is almost identical with the normal distribution curve, to which hemolysis by C' has been related by use of the method of probits.

The latter curve, being more completely understood theoretically and statistically, should be used in preference to the former. Erroneous applications of the logistic formula are discussed.

GITLIN, D., DAVIDSON, C. S., & WETTERLOW, L. H. (1949.) **The quantitative estimation of serum albumin in human body fluids by direct titration with specific horse antiserum.**—*J. Immunol.* 63. 415-425. [Authors' summary copied *verbatim*.] 1984

A horse was immunized with crystallized normal human serum albumin. The antibody response paralleled that previously observed during immunization of horses with egg albumin or diphtheria toxoid. An early bleeding yielded serum which did not contain precipitins for human serum albumin, but which did inhibit the precipitation of this antigen by specific rabbit antiserum. Serum obtained from subsequent bleedings gave the typical toxin-antitoxin precipitation curve.

Various methods for quantitative estimation of human serum albumin by precipitation with horse antiserum were tried, but most proved tedious and exacting. By taking advantage of the rapid rate of reaction between human serum albumin and horse antibody and its reversibility in the zone of antigen excess, a simple, quick direct titration procedure was developed and shown to yield results which agreed remarkably well with the electrophoretic estimation of human serum albumin in fractions of human plasma and in serum or other body fluids obtained from patients.

BAER, H., KABAT, E. A., & KNAUB, V. (1950.) **Immunochemical studies on blood groups. X. The preparation of blood group A and B substances and an inactive substance from individual horse stomachs and of blood group B substance from human saliva.**—*J. exp. Med.* 91. 105-114. [Authors' summary copied *verbatim*.] 1985

Blood groups substances have been isolated from the saliva of human beings of blood group B and from the linings of individual horse stomachs. The properties of the human B substances are similar to

those of hog and human blood group substances previously isolated. The horse substances showed lower hexosamine and reducing sugar and higher total and non-hexosamine nitrogen than do the materials from the other species. Materials isolated from individual horse stomachs possess either A or B activity or both. Certain stomachs yielded products of identical analytical composition, but with neither blood group A, B, or O activity as measured by their ability to inhibit isoagglutination. Fucose has been identified as a constituent of the horse blood group substances.

BRUNER, D. W., EDWARDS, P. R., & DOLL, E. R. (1948.) **Passive immunity in the new-born foal.**—*Cornell Vet.* **38.** 363-366. 1986

Observations on two groups of pregnant mares (one actively immunized against *Salmonella abortus-equi*, the other naturally against the foal's red cells) suggested that antibodies are transferred solely *via colostrum*. The titre of antibodies in the colostrum falls sharply after suckling for 12 hours.—G. FULTON ROBERTS.

BRUNER, D. W., DOLL, E. R., HULL, F. E. & KINKAID, A. S. (1950.) **Further studies on hemolytic icterus in foals.**—*Amer. J. vet. Res.* **11.** 22-25. 1987

Mare's serum containing antibodies (titre 1 : 10,000) against *Salmonella abortus-equi* was fed to nine foals; three were less than 12 hours old, two between 12 and 24 hours old, three between 24 and 36 hours old and one 72 hours old. Twelve hours after the forced feeding, those of the first group had titres of 1 : 200; the two of the second group had titres of 1 : 50 and 1 : 100, but the remaining foals developed no antibodies. These results suggest that from 36 hours after birth the foal can no longer absorb antibody unchanged from the alimentary tract.

An immunized mare had an agglutinin titre of 1 : 32 and a hæmolysin titre of 1 : 1,000 against the cells of the stallion which had sired the foal. 500 ml. of the plasma of this mare were given to each of three healthy foals one day old, the cells of which were incompatible with those of the mare. The red blood cell count fell,

in each case reaching a minimum 3—6 days after the infusion.

Twenty mares previously immunized were followed up in the 1949 foaling season, and ten new cases of hæmolytic icterus were observed. Some clinical and serological details are given. Five foals required treatment; they were removed from the dam for 48 hours, and, after the withdrawal of half to one litre of blood, were transfused with 1—2 l. of compatible blood.

[This paper contains a number of separate observations and should be consulted in the original by those interested. The authors consider that the iso-immunization is more akin to that in human beings against the A or B factors than against the Rh factors. The distinction is not quite clear and the evidence they present merely indicates that more than one red cell factor is involved.]

—G. FULTON ROBERTS.

TIMONEN, S., & ZILLIACUS, H. (1949.) **Sludged blood in allergy.** — *Acta med. scand.* **135.** 292-297. [Authors' summary copied *verbatim*.] 1988

In the present paper a series of twelve patients suffering mainly from skin allergic symptoms is presented. In all cases intravascular small-sized aggregation of red cells has been observed.

Aggregation as well as the allergic symptoms decreased or disappeared during treatment with heparin (Vitrum) or antisthin (Ciba).

The possible pathogenetic significance of the aggregation in allergy is discussed. The mode of activity of heparin and antisthin is considered.

COULSON, E. J., & STEVENS, H. (1949.) **Quantitative studies in anaphylaxis. III. Effective of the alum adjuvant and route of administration on the sensitizing dose.**—*J. Immunol.* **61.** 119-123. 1989

Six groups of g. pigs were used, three groups being injected with ovalbumen dissolved in saline and three with alum-precipitated ovalbumen; in each series one group was injected intra-abdominally, one intravenously and one subcutaneously. The antigen was given at different dose levels (0.0125—64 micro g.), ten g. pigs being used for each level.

The alum-precipitated ovalbumen had a sensitizing capacity ranging from 4-400 times greater than that of ovalbumen in saline. For ovalbumen in saline solution the sensitizing capacity of the antigen by intra-abdominal administration was about one-and-a-half times greater than by intravenous injection, and nearly two-and-a-half times greater than by subcutaneous injection; only the latter difference is statistically significant. For alum-precipitated ovalbumen the sensitizing

capacity by subcutaneous injection was two-and-a-half times greater than by the intra-abdominal route and 60 times greater than by intra-venous injection, both differences being statistically significant. When alum-precipitated antigen is injected into the subcutaneous tissue a nodule appears which may remain up to 32 weeks; it contains unchanged antigen, and probably serves as a reservoir for the slow release of antigen.—H. G. CLARK.

See also absts. 1868 (strangles vaccine); 1879 and 1880 (*Pfeifferella* agglutination); 1881 (swine erysipelas); 1934 and 1935 (F. & M. disease); 1958 (rinderpest, goat virus); 1965 (inactivated Newcastle disease vaccine); 2008 (complement fixation in hydatid disease); 2011 (serology in trichinosis).

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

BUSHLAND, R. C. (1948.) **Insecticides for the control of lice attacking man and animals.**—*Proc. 4th Internat. Congr. Trop. Med. Malar.* pp. 1670-1677. 1990

An account is given of wartime investigations of D.D.T. and other insecticides in the U.S.A., Great Britain, Germany and Russia for eradication of louse infestations in man. A short account is also given of American work on the control of lice on cattle, pigs, goats, sheep and poultry.

—M.C.

YEH, J., & DAVIS, D. E. (1950.) **Seasonal changes in abundance of fleas on rats at Baltimore, Md.**—*Publ. Hlth. Rep., Wash.* 65. 337-342. [Authors' summary copied verbatim.] 1991

To determine the seasonal changes in numbers of fleas on rats, 966 Norway rats (*Rattus norvegicus*) were captured in poultry warehouses in Baltimore from January 7, 1946, to March 3, 1947. For analysis the data were divided into seven seasons according to temperature and precipitation.

The infestation by *Xenopsylla cheopsis* was minimum in the prevernal season (2.1 percent. of the rats infested), maximum in the estival (55.7 percent.), declined in the postestival (25.6 per cent.), and again maximum in the autumnal (64.7 percent). The infestation by *Nosopsyllus fasciatus* was maximum in the hibernal (50.8 percent.), prevernal (57.2 percent.), and vernal seasons (59.3 percent.), and minimum in the postestival season (5.2 per

cent.). The infestation of *Leptopsylla segnis* was always small but was maximum in the vernal season (17.4 percent).

GRAHAM, N. P. H., & MONTGOMERY, I. W. (1949.) **The use of new insecticides in the control of ectoparasites.**—*Aust. vet. J.* 25. 239-251. 1992

The authors stressed the importance of host-parasite relationship as a factor in the control of ectoparasites, and pointed out that the efficiency of any insecticide depends not only on its toxic properties, but also on the way in which it is formulated and applied. Brief reference was made to the use of D.D.T. and benzene hexachloride for the control of ectoparasites of cattle, sheep, pigs, dogs, cats and poultry.—M. SCOTT.

CRAGG, J. B., & THURSTON, B. A. (1950.) **The reactions of blowflies to organic sulphur compounds and other materials used in traps.**—*Parasitology.* 40. 187-194. [Authors' summary copied verbatim.] 1993

Seven organic sulphur compounds likely to be produced in the breakdown of cystine have been tested under field conditions as blowfly attractants. Two of them, ethyl mercaptan and dimethyl disulphide, when mixed with hydrogen sulphide or carbon dioxide formed powerful attractants for females of the blowflies *Lucilia caesar* (and *L. illustris*) and *L. sericata*.

In the majority of trials 10 ml. 0.2%

ethyl mercaptan mixed with 10 ml. freshly saturated hydrogen sulphide solution was used as the control attractant. As a standard in the field-trapping studies this material overcomes many of the disadvantages of meat baits.

Sodium carbonate, sodium bicarbonate, ammonium hydroxide, ammonium carbonate and indole, at various concentrations, did not activate the organic compounds. Furthermore, when added to the ethyl mercaptan - hydrogen sulphide preparation they did not increase its activity.

In the present experiments oviposition was rarely induced. When it did occur it was associated with the presence of indole.

L. caesar responded to attractants placed 2 ft. from the ground as well as to the same materials placed on the ground. Height alone, therefore, was not responsible for the fact that *L. caesar* did not respond to the attractants when they were placed on sheep.

The response of blowflies to chemical attractants was linked with climatic conditions. Thus, under certain conditions, *Calliphora* spp., particularly *C. vomitoria*, responded to these attractants.

The results obtained in the present investigation emphasize the attractive nature of sulphur-containing compounds and the possible importance of hydrogen sulphide and carbon dioxide as sensitizing agents of such compounds on sheep.

Cragg, J. B. (1950.) **The reactions of *Lucilia sericata* (Mg.) to various substances placed on sheep.**—*Parasitology*. 40. 179-186. [Author's summary copied verbatim.] 1994

The reactions, under field conditions, of *Lucilia sericata* (Mg.) to various substances placed on sheep are described. Attempts to produce either attraction or oviposition by placing cystine or cysteine hydrochloride in the living fleece gave negative results. Several organic sulphur compounds of a type which might arise from the breakdown of cystine have been tested. All showed some power of attraction for *L. sericata*. Ethyl mercaptan and dimethyl disulphide were the most

powerful as attractants, but none of these substances was able to induce oviposition. Tests with ammonium compounds and carbon dioxide have shown that, at the concentrations used, ammonia acted as an attractant. For oviposition to occur carbon dioxide had to be present. Hydrogen sulphide was detected as a constituent of the fleece atmosphere of certain sheep. This substance, whilst having no attractive powers when used alone on sheep, increased the attractive powers of organic sulphur compounds. Comparative tests with ammonium carbonate-indole and ammonium carbonate ethyl mercaptan mixtures have shown marked variations in the relative powers of these preparations to induce oviposition.

A distinction is drawn between stimuli which attract *L. sericata* to sheep and those which induce oviposition. Ammonia and various organic sulphur compounds enhanced attraction, but both ammonia and carbon dioxide were necessary for oviposition. It is suggested that some of these materials may be produced under natural conditions from the breakdown of fleece keratin or by the bacterial decomposition of sweat and similar products in the fleece.

Morris, K. R. S. (1949.) **The science of tsetse control.**—*Nature, Lond.* 164. 1114-1115. 1995

In the Gold Coast, selective clearing of vegetation in fly areas proved far more effective than barrier clearing. Clearing was concentrated on the limited areas used by the tsetse flies in the dry seasons. Large areas of endemic sleeping-sickness have been reclaimed, the incidence of sleeping sickness has been reduced and the people are returning to the depopulated areas of the cleared rivers in increasing numbers. It is stressed that future maintenance of the cleared areas may be the decisive factor in large-scale operations, but in many areas the plant associations have been completely changed from closed evergreen riparian forest to open tree-grass associations which are easily farmed and hence denied to the tsetse-fly.

—S. BRIAN KENDALL.

Hayes, W. P., & Liu, Y.-S. (1947.) **Tarsal chemoreceptors of the housefly and their**

possible relation to DDT toxicity.—
Ann. ent. Soc. Amer. 40. 401-416.
 [Abst. in *Rev. Appl. Ent.* Ser. B. 38.
 11. (1950), copied *verbatim*.] 1996

The following is based on the author's summary. A detailed histological study was made of the tarsi of adults of *Musca domestica*, L., which are very susceptible to DDT, adults of *Blattella germanica*, L., and adults and larvæ of *Epilachna varivestis*, Muls., which are less susceptible. The cuticula, hypodermis and basement membrane form the wall, while the trachea, an unguitractoral tendon and a pair of nerves occur within and run throughout the tarsal segments. On the cuticula, there are several kinds of appendages, such as the spines, fixed hairs, tactile setae, tenent hairs and chemoreceptive setae.

Among the three species studied, chemoreceptive sensillæ were found only on the tarsi of *M. domestica*. They are situated latero-ventrally on the second to fifth tarsal segments and were not found either on the dorsal side of those segments or on the first tarsal segment. The chemoreceptive organ is composed of a group of sense cells situated in a sub-epidermal position and covered by a nucleated neurolemma continuous with that of the longitudinal nerve. The individual cells are more or less spindle-shaped. The sensillæ are attached at the distal end to a long, thin-walled chemoreceptive seta.

The thickness of the cuticula was 12.5-25 micron in *M. domestica*, 25-45 and 15-40 in adults and larvæ of *E. varivestis*, and 06-90 micron in *B. germanica*. Thus, it may be said that in general *M. domestica* which is highly susceptible to DDT, has a thinner cuticula than the less susceptible species tested.

MAUNDER, J. C. J. (1949.) **Cattle tick control: Results achieved in the field with DDT and BHC.**—*Qd. agric. J.* 69. 160-167. 1997

This article gives a resumé of information available on materials which have given satisfactory control of cattle tick (*Boophilus microplus*) under field conditions in Queensland. A proprietary preparation in the form of a paste containing 50% p.p.-isomer of D.D.T. is mixed with

water to give a suspension containing 0.56% p.p. D.D.T. This gives a good kill of ticks and an absolute protective period up to five days. At 0.28% p.p. D.D.T. good control is also obtained. The stability of this preparation in the dip is good; the concentration falls from 0.56 to 0.88% where it stabilizes, if fairly large numbers of cattle are going through the dipping vat and the paste is added at the initial rate. The concentration may fall to 0.2% D.D.T. if the dip is not used regularly. D.D.T. also gives control of buffalo fly, *Siphona (Lyperosia) exigua*, lice and "bush fly" [name not given]. Its higher cost is somewhat offset by the fewer dippings required. Emulsions of D.D.T. at 1% concentration can be used for spraying dairy herds.

Benzene hexachloride is used at a concentration of 0.05% gamma-isomer. It gives an excellent kill and acts more quickly than D.D.T. Its residual effect lasts up to three days. The preparations available are slightly less stable than D.D.T., reaching stability at about 0.03% active ingredient. It is inferior to D.D.T. for buffalo fly control but its cost is approximately the same.
 —M. T. SCOTT.

LEGG, J. (1950.) **Diethyl-p-nitrophenylthiophosphate (E605): a note on its effects on the cattle tick (*Boophilus microplus* Canestrini).**—*Aust. vet. J.* 26. 9-10. 1998

Three preparations containing diethyl-p-nitrophenylthiophosphate (E605) were tested for the control of *B. microplus* by spraying. They contained, respectively, (1) 20% E605 and 7% other ethyl thiophosphates, (2) 70% E605, and (3) 35% E605. Each preparation was tested at a concentration of 1 : 10,000. Excellent results were obtained on five cattle with No. 1 preparation; only a few engorged nymphs survived and some females laid viable eggs. No damage was done to any of the cattle. The other preparations were less effective and caused some dermatitis.

Later a fourth preparation containing 20% of the active principle was tried, at concentrations of 1 : 10,000 on two, 1 : 15,000 on three, and 1 : 20,000 on three cattle. Excellent results were obtained at the highest concentration with slight decrease

in efficiency at the lower concentrations. Engorged nymphs and females were most resistant. The low concentrations used and the lack of harmful effects on the host animal were the outstanding features of these preliminary tests.—M. SCOTT.

ARNOLD, R. M. (1949.) **Tick control measures. Assessment of the value of chemical tickicides for *Boophilus (Margaropus) annulatus* var. *microplus* in Jamaica.**—*Vet. Rec.* **61.** 198-201. 212-217. **1999**

A laboratory test involving immersion of batches of *Boophilus annulatus* var *microplus* contained in wire mesh baskets in solutions to be tested was made to assess the potentialities of a number of chemicals. A. concluded that chlordane, benzene hexachloride and benzene hexachloride combined with D.D.T., both at half the recommended strengths, offer most promise of being efficient acaricide dips. [While A.'s method of laboratory assessment of acaricides may be satisfactory when used with *B. annulatus*, it has been found that actively engorging *Ixodes ricinus*, when placed in contact with toxic substances, behave differently from individuals which are tested while not on a host.]—G. B. S. HEATH.

SCOTT, M. T. (1949.) **The failure of benzene hexachloride to control itch mite (*Psorergates ovis*).**—*Aust. vet. J.* **25.** 300-301. **2000**

The itch mite, *Psorergates ovis*, was not eradicated by dipping sheep in a number of formulations and concentrations of benzene hexachloride. At the highest concentrations, 0.056% gamma-isomer, only a few nymphs survived, but they soon restored the population to pre-treatment levels. The sheep were all dipped immediately after being shorn. The effect of benzene hexachloride was tested by the "patch" method [see V.B. **17.** 415] as well as in dipping trials.—H. McL. GORDON.

VAN DER MERWE, G. F. (1949.) **Ear scab in sheep and goats.**—*J. S. Afr. vet. med. Ass.* **20.** 93-98. **2001**

The mite of ear scab in sheep is indistinguishable from that of sheep scab, but attempts to establish it at any site other than the ear or infraorbital fossa have failed. Diagnosis depends upon demonstration of the mites in and below a wax plug which forms in the ear. Sheep acari are capable of infecting goats, but that of goat ear scab failed to infect sheep, although it also is morphologically similar. The author noticed that these ear parasites move more rapidly than acari which have become established on the body, and considers it possible that anatomical differences in the structure of organs of locomotion may yet be demonstrated.

Hand dressing with two parts of used motor oil mixed with one part of paraffin is a very effective remedy for ear scab.

—G. B. S. HEATH.

GOLDMAN, L., & FELDMAN, M. D. (1949.) **Human infestation with scabies of monkeys.**—*Arch. Dermat. & Syph.* **59.** 175-178. [Abst. in *Bull. Hyg., Lond.* **24.** 599. (1949), copied *verbatim*.] **2002**

Scabies involved a group of 10 gibbons sent from Siam. Five persons who cared for these animals contracted the disease. Scrapings from the animals' tissue revealed many parasites identical with the *Sarcoptes* organism of infestations in human beings. The clinical and histologic picture in the gibbons suggested a scabies norvegica type. All of the gibbons eventually died. The clinical picture in the human subjects was that of a typical and mild scabies infestation.

O'FLAHERTY, F., & RODDY, W. T. (1948.) **Animal skin diseases and their influence on leather.**—*J. Amer. vet. med. Ass.* **112.** 133-135. **2003**

The value of leather is greatly reduced by damage to the skin of the animal during life. Skin parasites may contribute to this damage. Over 50% of hides received by the Hide Bureau of America are stated to have been seriously affected by the larvæ of *Hypoderma* spp.—S. BRIAN KENDALL.

See also absts. 1888 (tick-transmitted tularaemia); 1927 (ticks transmitting anaplasmosis); 1969 (tick-borne fever in cattle).

PARASITES IN RELATION TO DISEASE [HELMINTHS]

KENDALL, S. B. (1949.) **Nutritional factors affecting the rate of development of *Fasciola hepatica* in *Limnæa truncatula*.**—*J. Helminth.* **23.** 179-190. [Author's summary copied *verbatim*.] **2004**

This paper describes some hitherto unrecorded aspects of trematode development in a molluscan host.

It is shown that the rate of development of *Fasciola hepatica* in its host *Limnæa truncatula* is influenced not only by temperature but by the amount of food assimilated by the snail and by the number of rediæ which are in competition within a single host.

The most rapid development of the parasite will occur in hosts which have access to ample supplies of food and in which moderate numbers of rediæ become established. At laboratory temperatures, infection with a single miracidium rarely leads to the establishment of more than 40 rediæ, a number which is apparently adjusted to the economy of the host, since it allows development at a maximum rate.

ALVES, W. (1949.) **The eggs of *Schistosoma bovis*, *S. mattheei* and *S. hæmatobium*.**—*J. Helminth.* **23.** 127-134. [Part of author's summary copied *verbatim*.] **2005**

Measurements of 500 eggs respectively of *S. bovis*, *S. mattheei* and *S. hæmatobium* were made. These measurements included length, maximum breadth, and breadth at a point 50 microns from the non-spiked end of the egg. Statistical analysis of the results shows that it is possible to differentiate between the three groups of eggs.

Reasons are adduced for suggesting that the statement that *S. mattheei* cannot infect man is not well founded.

PULLAR, E. M., & McLENNAN, G. C. (1949.) **Sparganosis in a Victorian pig.**—*Aust. vet. J.* **25.** 302-304. **2006**

Ribbon-like parasites up to 50mm. long and 2mm. wide, found between the muscle fibres throughout the carcass of a pig were spargana, probably the plerocercoids of *Diphyllbothrium erinacei*. This cestode commonly occurs in cats and foxes and occasionally in dogs in Eastern

Australia. The specimens had been repeatedly frozen and thawed and showed degenerative changes. The usual host of the plerocercoid is the frog, and it is thought that the pig was a "transport" or "waiting" host which had been infested by ingestion of frogs. The carcass also harboured many oval, caseous, cyst-like lesions 5-8 mm. long scattered through the muscles. The cysts resembled degenerated cysticerci, but may have been dead spargana undergoing absorption.

The life cycle of *D. erinacei* is described and depicted in a diagram and there are references to previous records of spargana in Australia.—H. McL. GORDON.

HAMILTON, A. G. (1950.) **The occurrence and morphology of *Coenurus serialis* in rabbits.**—*Parasitology.* **40.** 46-49. [Author's summary copied *verbatim*.] **2007**

Two specimens of *Coenurus serialis* in the rabbit are described. The duration of infection is estimated at 18-24 months. Secondary external daughter coenuri had developed within the same adventitious cyst of host tissue as the primary coenuri. No internal daughter coenuri were found within the primary coenuri. Both primary coenuri contained some scolices which had developed vesicles (ranging from 3 to 30 mm.) in their 'neck' region. These vesicular scolices remain attached to the germinal layer until the vesicle is 4-5 mm. in diameter, when they become detached. These would appear to be the internal daughter coenuri of many authors but are here shown to be degenerating scolices.

PIROSKY, I., DE PIROSKY, R. R., & DE YALOV, S. (1949.) **Fracções de larva hidática que fijan el complemento. [Fractions of hydatid larvæ which fix complement.]**—*Rev. Inst. bact., B. Aires.* **14.** 287-298. [English summary slightly modified.] **2008**

Fractions obtained from hydatid larvæ were tested for their complement-fixation capacity with respect to serum of cyst-carrying subjects. The study of: (1) the hydatid fluid, (2) the water-soluble fraction, (3) the fractions soluble in organic

solvents and (4) the so-called hydatid integral antigen, led to the following conclusions:

(1) The complement-fixation capacity of the hydatid fluid depended upon its protein content. (2) Of the water-soluble fraction, the protein part alone formed optimum complexes with the corresponding antibody. The systems affording maximum reaction-sensitivity contained 10-50 ug. of antigen. This protein fraction was a species-specific antigen. (3) Among the fractions soluble in organic solvents, it was found that the alcohol-extract and the ether-soluble, acetone-insoluble fractions were capable, in amounts between 5-80 ug. of fixing the complement. In higher quantities the reaction tended to become less specific. These organic-solvent-soluble fractions displayed group-specificity. (4) The hydatid integral antigen was capable of fixing complement; definite conclusions, however, do not yet seem warranted.

In 50 cases of clinically established hydatid cyst, the following percentages of positive serum reactions were obtained: With hydatid fluid 77, with the protein fraction 85, with the alcoholic extract 84, with the ether soluble, acetone-insoluble extract 65.

Although the authors do not attribute statistical significance to these figures, they suggest that—by its specificity and sensitivity—the protein fraction is the most appropriate antigen for a serological reaction diagnosis of hydatid cyst in human beings.

BROWN, M., CRONK, L. B., DESINNER, F., GREEN, J. E., GIBBONS, I. E., & KUITUNEN-EKBAUM, E. (1949.) **Trichinosis on Southampton Island, N.W.T.**—*Canad. J. publ. Hlth.* 40. 508-513. 2009

During a visit to Southampton Island, N.W.T., in 1947, Brown *et al.* suspected the presence of trichinosis in the Eskimo population. In 1948, one of them demonstrated the larvæ of *Trichinella spiralis* in the musculature of two of three polar bears examined.

Diagnosis of infection in the Eskimo population was based on the examination of blood smears for eosinophilia and the result of skin and precipitin tests. The

skin and precipitin tests are described.

—T. MOORE.

WIRD, K. (1946.) **A trichinosis epidemic in the Boraas district, its clinical and epidemiological aspects.**—*Acta med. scand.* 126. 1-16. [In English; abst. from author's summary.] 2010

Trichinosis is uncommon in Sweden. Four epidemics observed were attributable to trichinous pigs coming from the same part of the country, Västergötland.

An account is given of an epidemic of trichinosis in the Boraas district, comprising 37 cases, and also of a sporadic case that appeared nine months later. In both instances the source of the infection was soon traced to a trichinous pig.

The possibility of infection of pigs from foxes is discussed.

ROTH, H. (1946.) **Employment of serological and skin tests at outbreaks of trichinosis in the Alingsås and Boraas districts (Sweden).**—*Acta. med. scand.* 126. 17-33. [In English; abst. from author's summary.] 2011

The value of different methods of diagnosing trichinosis is discussed. It is emphasized that direct demonstration of the parasites in the stools, the blood, or the muscles of the patient may often fail. Therefore, the use of skin and serological tests will be preferable in most cases. In two outbreaks the intradermal and precipitin tests with an antigen prepared from dried, pulverized, extracted and filtered larvæ of *Trichinella spiralis* often yielded good results, but not in all cases; on the other hand, false positive reactions occurred.

A microscopic precipitin test, however, with living larvæ proved to be most sensitive and specific. 49 patients with a more or less distinct history of trichinosis were positive with this test, while 14 other persons with no history of illness or only a vague one, yielded no reaction. The test changed from negative to positive during the second or third week of illness. The sera from 23 patients, re-examined after 7½ months, still gave a positive reaction, while 1 out of 5 sera, which were re-examined after 12 months, was negative.

BAILEY, W. S. (1949.) **Studies on calves experimentally infected with *Cooperia punctata* (v. Linstow, 1907) Ransom, 1907.**—*Amer. J. vet. Res.* **10.** 119-129. **2012**

B. discusses the evidence for assuming that *Cooperia punctata* is pathogenic in cattle. He infected calves (2½-12 months old) with larvæ of this parasite and observed that the prepatent period was 11-16 days and that eggs continued to be passed in the fæces for 276-290 days after infection. No age resistance was observed up to 12 months, but re-infection resistance was successfully demonstrated. One calf which was given large numbers of larvæ at short intervals, receiving several million altogether, developed severe symptoms and apparently would have died as a result of the infestation. Loss in weight was evident three weeks after infection, this was progressive and accompanied by diarrhoea. About 65 days after infection the calf was very weak and emaciated. When moribund it was killed; at the time of death the egg count was 70,000 per gm. of fæces and 728,000 worms were recovered P.M. Although this calf had no manifest anæmia, innumerable hæmorrhages were demonstrable in the first 10 feet of the intestine. The mucosa was extensively degenerated and was infiltrated with lymphocytes and eosinophiles. Both adult worms and larvæ were found buried in the intestinal wall of this calf, but in less heavy infestations there was no evidence that the worms migrate in the wall of the intestine.—J. F. A. SPRENT.

REES, G. (1950.) **Observations on the vertical migrations of the third-stage larva of *Hæmonchus contortus* (Rud.) on experimental plots of *Lolium perenne* S24, in relation to meteorological and micrometeorological factors.**—*Parasitology.* **40.** 127-143. [Author's summary copied *verbatim*.] **2013**

The cycle of vertical migration of the infective larvæ of *Hæmonchus contortus* on experimental plots of *Lolium perenne* S 24, kept out of doors, has been related to meteorological and micrometeorological factors.

The three main factors concerned with vertical migration are temperature,

humidity and light intensity. In the majority of cases the greatest number of larvæ are on the grass blades in the early morning and in the evening, less being recovered at night and during the middle of the day. The time of the morning maximum becomes progressively earlier passing from winter to summer, and the time of the evening maximum progressively later. The reverse is true in the second half of the year. Low and high temperatures accompanied by low humidity inhibit vertical migration on the grass. High humidity (continuous precipitation) does not prevent migration, the two daily maxima are apparent, but the numbers climbing are less than in the absence of rain.

ROGERS, W. P. (1949.) **The biological significance of hæmoglobin in nematode parasites. I. The characteristics of the purified pigments.**—*Aust. J. sci. Res. Ser. B.* **2.** 287-303. [Author's summary copied *verbatim*.] **2014**

Hæmoglobins from *Nippostrongylus muris*, *Nematodirus* spp., and *Hæmonchus contortus* were purified by ammonium sulphate fractionation and their properties examined. All the hæmoglobins showed a very high affinity for oxygen; the tension of half saturation (p_{50}) for *Nematodirus* hæmoglobins of concentrations about 1×10^{-4} g.-atoms of iron per l. at pH 7.4 was in the region of 0.04 mm. of mercury. The p_{50} for *H. contortus* hæmoglobin was similar to that of *Nematodirus* spp.; *N. muris* hæmoglobin had a somewhat higher p_{50} . The parasite hæmoglobins all showed an unusually low affinity for carbon monoxide, the equilibrium constant, $K = \frac{[\text{HbCO}]}{p\text{O}_2 [\text{HbO}_2]} \times p\text{CO}$, having a value of about 1. The "span," the distance between the alpha-bands of oxyhæmoglobin and carboxyhæmoglobin, varied from 60 to 65 Å. for the three parasites. None of the hæmoglobins obtained from the parasites showed properties supporting the view that there is a linear relationship between log K and the "span."

The parasite hæmoglobins and their derivatives differed only very slightly from those of their host in their spectroscopic properties. However, the parasite

hæmoglobins all showed a very much higher affinity for oxygen and a lower affinity for carbon monoxide than the pigments prepared from host blood.

The possible physiological function of hæmoglobin in the parasites is discussed.

MASSEY, V., & ROGERS, W. P. (1949.) **The tricarboxylic acid cycle in nematode parasites.** [Correspondence.] — *Nature*, Lond. 163. 909. 2015

Studies on the carbohydrate metabolism of *Ascaridia galli*, *Nematodirus spathiger*, *Nematodirus filicollis*, and *Neoplectana glaseri*, were extended to include some aspects of the oxidative utilization of pyruvate. Results indicated that though a form of the Krebs tricarboxylic acid cycle is functional in the parasite tissues, succinate oxidation relative to the total oxidative activity is less important than in pigeon breast muscle.—G. M. URQUHART.

MAPES, C. R. (1949.) **Notes on the biology of *Mullerius minutissimus* Megnin, 1878, and a report on therapy with 1-diethylcarbamy 4-methylpiperazine hydrochloride, caricide, in sheep.** — *Thesis*, Cornell. pp. 100. 2016

Zonitoides arboreus is a potential vector of *Muellerius minutissimus*. In the snail, development to the infective stage is accomplished in 27 days or less. *Triodopsis abolabris* and *Anguispira alternata* are probably refractory to invasion by the organism. Transmission to the goat occurs readily by accidental ingestion of the molluscs with vegetation. *M. minutissimus* adults in sheep lungs may produce viable ova for as long as eight months after infection.

"Carcide" when given to sheep per os at a dosage rate of 300 mg. per kg. body weight per day has no effect on food consumption and assimilation, and causes no apparent toxic reactions. The drug produces a marked lethal action against *Strongyloides papillosus* and *M. minutissimus*. The drug is somewhat less effective against the strongyloid worms.

—H. L. GILMAN.

KUNG, C. C. (1949.) **Notes on some avian species of *Ascaridia*.**—*J. Helminth.* 23.

95-106. [Author's summary copied verbatim.] 2017

A large collection of avian *Ascaridia* from a wide diversity of hosts and localities is reported upon. It comprised six species, *A. galli*, *A. columbæ*, *A. compar*, *A. cristata*, *A. hermaphrodita* and *A. numidæ*. Their morphology is examined critically with reference to previous descriptions, especially in the case of *A. columbæ*, *A. cristata*, *A. hermaphrodita* and *A. compar*, and a new variety of *A. columbæ* is described.

The taxonomic significance of spicule morphology and the tubercles on the ventral surface of the male tail in *Ascaridia* is discussed.

Ascaridia sinensis, *A. lineata*, *A. perspicillum*, *A. granulosum* and probably also, *A. styphlocerca*, are considered to be synonyms of *A. galli*.

OTTO, G. F., & MAREN, T. H. (1949.) **Studies on the chemotherapy of filariasis. Parts I-IV.** — *Amer. J. Hyg.* 50. 92-141. [Authors' summaries copied verbatim.] 2018

I. Introduction to series, no summary is given.

II. These in vitro studies have revealed that the phenyl arsenoxides as a group are both more active and more rapid in their activity than the antimonials or any other group of compounds we have studied. Attention was particularly focussed on the p-amide substituted compounds as having the most favourable "therapeutic index." It was noted also that two of these p-amide substituted compounds (p-arsenosobenzamide and "arsenamide") apparently did not have the same affinity for erythrocytes as unsubstituted phenyl arsenoxide, since the presence of erythrocytes does not interfere with the microfilaricidal activity of the former as they do with the latter.

III. In these studies on the use of various arsenicals and antimonials in the cotton rat only the substituted phenyl arsenoxides appeared to offer hope for improved therapy of filariasis. Of these the p-amide substituted compounds showed a consistently high degree of lethal action upon the adult worms. The

insoluble p-arsenosobenzamide (serial No. 86, T.D.C. No. 622) and its soluble thioglycollate derivative (arsenamide, serial No. 96, T.D.C. No. 970) seemed to be the most effective in practical doses. The latter, however, had little or no direct effect upon the microfilaria in practical doses; nearly 5 months elapsed before the microfilaria disappeared following destruction of the adult worms with this compound.

It is noted that the two pentavalent antimonials studied had no effect upon *Litomosoides carinii* in the cotton rat in doses which could be considered feasible for administration to man but were very effective against the adult worms in higher doses. It is further noted, however, that cotton rats appear to be both more tolerant of arsenic and antimony and to be in need of higher therapeutical doses than many other species.

It was noted that trivalent antimonials, in particular, appear to be more toxic for females than male *L. carinii* and attention is called to the uncertainty which would result from the use of the microfilaria as an index of effective therapy if the same situation obtains with *Wuchereria bancrofti* in man.

IV. Trivalent antimonials will quickly kill the microfilaria of *D. immitis* without immediately killing the adult worms. The reproductive organs of the females are injured and apparently permanent sterility results. At least some of the sterilized females may die within a few months but some may live for a very long time. Destruction of the microfilaria and their continued absence from the blood stream following the use of trivalent antimonials cannot alone be accepted as evidence that the adults have been killed.

No such effect upon the adult worm has been reported for the arsenicals, cyanines or piperazines. Two of the

phenyl arsenoxides p-arsenosobenzamide and arsenamide, have been shown to kill immediately the adult worms without destruction of the microfilaria at doses which seemed feasible for man. It may require a year or more after the death of the adult worms before the microfilaria disappear.

KINGMA, F. J. (1949.) **Observations in treating canine filariasis.**—*J. Amer. vet. med. Ass.* **114.** 322-325. **2019**

Since there is doubt regarding the relative susceptibility of adult filarial worms and of their larvæ to foudadin (a complex salt of antimony and catechol-potassium-sulphonate), K. administered the drug intramuscularly to affected dogs until symptoms of poisoning appeared. Before the appearance of these described toxic symptoms, blood counts revealed a marked neutrophile leucocytosis, and this was the end-point of administration of the drug. K. also referred to arsenamide p-(bis [carboxy methyl mercapto] arsinio) benzamine, which was stated to have been used on 40 dogs, with promising results, no details being given.—JAS. G. O'SULLIVAN.

DE SALES, J. F., & JANSEN, J. (1945.) **Xenodiagnóstico na habronemose dos equideos. Estudo das larvas de Helminto. [Xenodiagnosis of habronemiasis in horses.]**—*Mem. Inst. Osw. Cruz.* **42.** 207-215. [English summary.] **2020**

Diagnosis was made by examining flies which had been bred in samples of suspected faeces. The larval habronema worms are readily found by squashing the flies between a cover glass and a glass slide and examining under a low power of the microscope. An apparatus for this technique is described and illustrated. Eighty-seven samples of horse dung were examined, of which 85 were positive for habronema. The method is simple and practicable.—M.C.

SPONTANEOUS AND TRANSMISSIBLE NEOPLASMS AND LEUCÆMIAS [INCLUDING FOWL PARALYSIS]

OTTOSEN, H. E. (1949.) **Studies on sarcomata of the skin in dogs.**—*Nord. Vet.-Med.* **1.** 7-30. [In English, author's summary modified.] **2021**

Using the histogenetic classification of tumours, the writer suggests that the reticulo-endothelial sarcomata should no longer be considered as a separate tumour

group. On the other hand, all atypical mesenchymal tumours should be classified according to the principles adopted for classification with the reticulo-endothelial sarcomata, i.e., on the basis of the character and degree of the differentiation of the tissue. On this system he has classified 93 cases of sarcoma from about 200 cases of skin-tumours in dogs.

The majority were reticulosarcomata, i.e., rather primitive sarcomata in which an intercellular network of fibrils could be demonstrated by silver impregnation. They occurred chiefly in the corium. Clinically, they were rather benign, provided they were removed at an early stage. Attention is drawn to their resemblance to the so-called venereal sarcomata in dogs.

There were ten histiocytic sarcomata, usually occurring in the subcutis. They were fibril-producing, though to a lesser degree than the reticulosarcomata. However, the two groups of tumours could not be absolutely clearly distinguished from each other.

There were eight cases of a sarcoma-like new formation which could not with certainty be recognized as a true autoblastoma, but was more likely to be considered as a simple proliferation of reticuloendothelial (mesenchymal) cells. No definite distinction, however, could be drawn between the histiocytic sarcomata and the sarcoma-like cell proliferations. Both conditions seemed to be rather benign; though in the case of the sarcoma-like cell proliferation there was a tendency for new nodules to appear at intervals in different regions.

There were sarcomata of greater differentiation in 16, 13 of which were spindle-celled sarcoma.

There was evidence that there were sarcomata representing an intermediate stage between reticulosarcomata and spindle-celled sarcoma.

There were no completely undifferentiated sarcomata, nor endotheliomata.

SHAPIRO, D. M., & WARREN, S. (1949.) **Cancer innervation.** — *Cancer Res.* 9. 707-711. [Authors' summary copied *verbatim*.] 2022

Tumor blood vessel contraction in Brown-Pearce carcinoma and mouse mesothelioma (MT₁) anterior chamber transplants results from sympathetic nerve stimulation and nerve fibers within these tumors have been demonstrated. These observations imply that functioning nerve fibers can grow into cancerous tissue. These experiments further suggest that the reported variations in rate of growth of tumors in tissues under different states of disturbed innervation may be due to vasomotor changes.

GREENE, H. S. N. (1949.) **Heterologous transplantation of the Brown-Pearce tumor.** — *Cancer Res.* 9. 728-735. [Author's' summary copied *verbatim*.] 2023

The heterologous transplantation of the Brown-Pearce tumor has been described. The tumor was successfully transplanted to the eyes, testicles and subcutaneous tissues of mice, hamsters and rats, but failed to grow at any site in guinea pigs.

BOUTWELL, R. K., BRUSH, M. K., & RUSCH, H. P. (1949.) **The stimulating effect of dietary fat on carcinogenesis.** — *Cancer Res.* 9. 741-746. [Authors' summary copied *verbatim*.] 2024

The relationship of dietary fat to the incidence of carcinomas induced in mice with carcinogenic hydrocarbons was investigated. Synthetic type diets were fed in which caloric intake was varied by removing glucose from the ration and the level of fat was increased from 2 per cent. to 27 per cent. or to 61 per cent. by isocaloric substitution for glucose.

The diet containing 61 per cent. fat and no carbohydrate stimulated carcinogenesis about the same as diets containing 27 per cent. fat. This suggested that dietary fat *per se* does not promote the formation of skin carcinomas induced with benzopyrene.

When the tumor promoting action of diets containing 2 per cent. and 27 per cent. fat were compared at two calorie levels it was shown that the greater net energy value of the higher fat diet was sufficient to account for all of the stimulating effect

of the 27 per cent. fat diet on tumor formation.

For a true appraisal of the effect of the three major dietary components on the induction of tumors, the diets should be fed on the basis of an equal net energy value rather than isocaloric allowances calculated from the gross caloric values of the dietary components.

Mice that were fed a diet containing 61 per cent. of fat and no carbohydrate for 254 days gained weight and appeared normal.

BOUTWELL, R.K., BRUSH, M. K., & RUSCH, H. P. (1949.) **The influence of vitamins of the B complex on the induction of epithelial tumors in mice.**—*Cancer Res.* 9. 747-752. [Authors' summary copied verbatim.] 2025

The influence of variations in the amount of vitamins of the B complex and of unknown nutritive factors on the formation of tumors induced by applications of carcinogenic hydrocarbons on the skin of mice was investigated. The food intake was controlled at isocaloric levels within each experiment. The various diets tested can be characterized as follows: 1, control; 2, all vitamins high; 3, all vitamins low; 4, thiamine and riboflavin low; 5, pyridoxine low; 6, niacin and pantothenic acid low; 7, the remaining 5 crystalline B vitamins low; 8, pteroyltriglutamic acid substituted for pteroylglutamic acid; 9, whole wheat-whole milk powder; 10, rice; and 11, a highly purified diet. The rate of tumor induction was not influenced by these various regimens with the exception of diet number 3. This diet resulted in a lower tumor incidence and an acrodynia in the mice which was relieved by the administration of pyridoxine.

SMITH, W. E. (1950.) **The neoplastic potentialities of mouse embryo tissues. V. The tumours elicited with methylcholanthrene from pulmonary epithelium.**—*J. exp. Med.* 91. 87-104. [Author's summary copied verbatim.] 2026

The lung tissue of mouse embryos of the C strain proliferates to some extent after implantation in adult hosts of the same breed and rapidly differentiates,

forming a parenchyma remarkably like the normal. The grafts persist long. When methylcholanthrene dissolved in olive oil has been introduced with them much more growth of them occurs. The carcinogen induces a pronounced metaplasia of the epithelium of the bronchial tree, and the altered cells are often aggressive, multiplying, invading, and largely replacing the parenchyma about them. So closely do they resemble malignant elements in aspect and behavior that it is frequently difficult to tell whether carcinomatous change is not actually present. Genuine tumors soon arise, multiple benign adenomas sometimes appearing within three weeks, and indubitable carcinomas a few weeks later. Not a few of the cancers are of transitional cell type, that is to say, are expressive of an intermediate stage in the metaplasia.

Under the influence of methylcholanthrene the cells lining the alveolar spaces of the graft sometimes undergo metaplasia also, with result in stratified squamous epithelium. It follows that there is reason to doubt the current assumption that all squamous cell carcinomas of the lung necessarily arise from the bronchial tree. The findings, taken with others previously reported, make it difficult to suppose, furthermore, that the generality of lung tumors can be due to neoplastic viruses entering the organism in postnatal life and having no broader scope than those thus far discovered.

DAVIS, O. S., & DOYLE, L. P. (1949.) **Studies in avian leucosis. IV. Further transmission of visceral lymphomatosis.**—*Amer. J. vet. Res.* 10. 85-91. 2027

Material prepared from the liver, spleen, heart, kidneys, ovary and defibrinated blood of two field cases of visceral lymphomatosis was inoculated respectively into six groups of 50 18-day-old chicks. Adequate controls from the same flock were maintained.

The evidence of visceral lymphomatosis increased from 16.2% in the controls to 32-60% (average 43%) in the inoculated groups. Nine per cent. of neuro-lymphomatosis occurred in the inoculated birds and 10.8% in the controls. The data

indicate that visceral lymphomatosis was transmitted as a separate entity from neuro-lymphomatosis. The highest percentage of cases occurred in the liver-inoculated group and the lowest in the ovary group.

See also abst. 1977 (induced tumour immunity in rats).

NUTRITIONAL AND METABOLIC DISORDERS

BRUCE, H. M. (1947.) **Feeding and breeding of laboratory animals. IV. Breeding of rabbits without fresh green food.**—*J. Hyg., Camb.* 45. 169-172. [For Part III see V.B. 18. 208.] 2028

The growth rate and breeding performance of 14 female rabbits, which were maintained on a pelleted diet that included 10 per cent. lucerne meal and 30 per cent. dried grass, were satisfactory. Water was given freely, each animal was housed separately, and weighings were normally done once or twice weekly. The percentage of young which were weaned did not fall below 67 in any sub-group of animals.

There were no differences between the growth rates of the first and second, F1, generations.—J. T. ABRAMS.

I. BRUCE, H. M. (1947.) **The feeding and breeding of laboratory animals. VI. The breeding of mice.**—*J. Hyg., Camb.* 45. 420-430. 2029

II. BRUCE, H. M., & EMMENS, C. W. (1948.) **The feeding and breeding of laboratory animals. VII. Methods of testing the adequacy of diets for breeding mice.**—*J. Hyg., Camb.* 46. 315-324. 2030

I. The effect of colony management on the productivity of laboratory mice is the subject of this detailed study.

Two groups, each of 24 female albino mice, were mated on different systems over a period of one year.

The first group was subjected to continuous mating in monogamous pairs. This unbroken intensive breeding caused 78 per cent. of the females to become pregnant again at *post-partum* œstrus.

In the second group, the females were mated in polygynous groups, removed for parturition, and returned to the male only after the litter had been weaned.

The survival period in the spontaneous cases averaged 242 days, whereas in the inoculated cases it averaged 189.5 days. Seven successful serial passages of visceral lymphomatosis are recorded.—D. LUKE.

In the period under consideration, 1,149 young were reared to weaning under the first system, and 559 under the second. The monogamous system therefore caused the usefulness of a female to be approximately doubled, as compared with the polygynous one.

A particularly good diet was used, but its dry nature precluded a reliable measurement of food consumption.

The maternal organism was not visibly affected by the continuous system.

Apart from the actual number of young produced, no difference was seen between the two methods, as regards the mortality of breeding females, the litter size, the weight of the young at weaning, the effect of parity, the loss of litters and of young between birth and weaning, and the sex ratio of the young weaned.

Ample numerical data and regression lines are given to illustrate the interaction of concurrent gestation and lactation upon the length of the gestation period. The effect of the number of young concomitantly suckled upon the length of gestation is best described by a highly significant simple regression of the one on the other.

While the polygynous system has the disadvantage of great fluctuations in its demands on labour and equipment, the overall labour requirement over a long period is said to be probably much the same for the two methods.

II. The authors describe factorial methods of testing breeding diets for mice. The adequacy of such diets is dependent upon their physical state, the nature and amount of the dried milk, the content of dried yeast and meat and bone meal, and the cereal component.

The factorial test simultaneously employs all possible combinations of the

dietary factors under investigation, leads to a highly accurate examination of each point at issue, and is therefore eminently suitable for the study of dietary effects.

Both of the systems of breeding described by Bruce [see preceding abst.] were used in these tests, but preference is expressed for the system of monogamous mating, involving a continuous series of pregnancies with concurrent gestation and lactation, since this provides a more rapid method of checking the results of major changes in the diet.

Since there was found to be significant statistical heterogeneity, variance analysis was based throughout on the square roots of (a) the total number of young born, (b) the total number of young weaned, and (c) the total weight of young weaned, in respect of each female in a test period.

The exact nutritional requirements for breeding mice were not determined, but they appear to be similar to those of rats.

A high yeast content or a high wheat content seems to be desirable. A diet containing a considerable proportion of full-cream milk proved very effective, but it is not yet certain that this constituent is necessary.

The dietary implications of these tests will be discussed in a later paper.

—G. P. MARSHALL.

SHORT, D. J., & PARKES, A. S. (1949.) **Feeding and breeding of laboratory animals. X. A compound diet for monkeys.** — *J. Hyg., Camb.* **47.** 209-212. **2031**

The use of cubed diets for monkeys is described. Weight curves of Rhesus and Mangabey monkeys satisfactorily maintained on cubes, supplemented with green food and water only, are reported. Two females were maintained throughout pregnancy and lactation on such a diet and four more throughout lactation. Animals which did not receive green food supplements developed scurvy and one died.

—P. H. HERBERT.

WILLIAMS, J. B., & KNOTT, C. B. (1949.) **The value of milk replacements in the rations of dairy calves.**—*J. Dairy Sci.* **32.** 986-992. **2032**

In comparative feeding trials of four

different milk substitute formulæ, satisfactory growth rates were obtained with three of the formulæ. The fourth formula produced deleterious effects, namely scouring, loss of hair, muscular incoordination and weakness, lachrymation, loose teeth, and swollen, painful gums. The diet on which these symptoms were produced contained a higher proportion of ground beet pulp than the others. In unsuccessful efforts to correct these symptoms additions of the following substances to the diet were tried, ascorbic acid, biotin, casein, calcium pantothenate, riboflavin, vitamin A, choline chloride, cystine, methionine, [The symptoms described in these calves have some resemblance to those of "sweating sickness" of calves in Africa and Asia and which, according to Kenya workers, respond to treatment with thiamine.]

—M.C.

FOLLEY, S. J. (1949.) **Nutrition and female fertility.**—*Brit. J. Nutrit.* **3.** 91-96. **2033**

A short summary of the action of the various hormones involved in female fertility is given. Gonadotrophin production is impaired on a restricted diet. As yet the exact cause of anæstrus among heifers in winter in Great Britain is not known; it may be a nutritional deficiency affecting pituitary function. Sterility may also be caused if œstrogen inactivation in the liver is impaired as in aneurin, riboflavin or methionine deficiency. A lack of folic acid, however, decreases the response of chick oviducts to œstrogen. Excessive intake of œstrogen from subterranean clover also causes infertility.—E. EDEN.

HUGGETT, A. St. G. (1949.) **Nutrition and viable young.**—*Brit. J. Nutrit.* **3.** 96-100. **2034**

General shortage of food seems to run concurrently with impaired reproductive power. During the 1939-45 war, in many areas, there was in human beings a depression in conception rate and consequently also in the birth rate and the average weight at birth. An increased abortion rate and number of premature births were also noted.

Lack of food was found to inhibit the œstrous cycle and ovulation. In experimental animals deficiency of vitamin A or

of the vitamin B complex produces similar effects. Vitamin E deficiency hinders placental development by destruction of the mesodermic tissue. The lack of vitamin A or riboflavin also retards foetal development by causing congenital deformities such as cleft palate and malformation of other organs. Manganese deficiency in rats produces imperfect lactation and pre-natal mortality. The cause of pregnancy toxæmia is unknown, but the severity of the disease can be influenced by alteration of rations.—E. EDEN.

BURROUGHS, W., FRANK, N. A., GERLAUGH, P., & BETHKE, R. M. (1950.) **Preliminary observations upon factors influencing cellulose digestion by rumen micro-organisms.** — *J. Nutrit.* **40.** 9-24. [Authors' summary copied *verbatim*.] **2035**

A laboratory method is described for studying cellulose digestion by rumen microorganisms. The major features of this method include the use of continuous 36-hour fermentation periods, in which the original starting inoculum was a mixed culture of organisms taken directly from the rumen of cattle. The inoculum used in the second and succeeding 36-hour periods consisted of half the residue from the preceding fermentation. Cellulose digestion was determined chemically on the half portions not used as inoculum, and Gram stains of the microflora were observed at the beginning and end of each fermentation period.

Application of the method in preliminary trials resulted in data showing pronounced differences in the ability of rumen microorganisms to digest cellulose, depending upon additions or withdrawals from the nutrient medium as the fermentation periods progressed. Additions which proved helpful to cellulose digestion included a complex salt solution, the ash of alfalfa extract, autoclaved rumen liquid, and an autoclaved water extract of manure. Recovery trials with certain additions of these materials restored the ability to digest cellulose which had previously been lost through the omission of such additions.

REED, F. M., MOIR, R. J., & UNDERWOOD, E. J. (1949.) **Ruminal flora studies in the**

sheep. I. The nutritive value of rumen bacterial protein.—*Aust. J. sci. Res. Ser. B* **2.** 304-317. [Authors' summary copied *verbatim*.] **2036**

Two large samples of "mixed" rumen bacteria, virtually free from protozoa and feed residues, were prepared from abattoir sheep, one from sheep coming from "green" feed conditions and the other from "dry"-fed sheep.

The "true" digestibilities and biological values of the crude protein of these preparations were determined by nitrogen-balance method with young growing rats and compared with "standard" casein. The cyst(e)ine and methionine contents of the rumen bacteria samples and of "whole" protein preparations made from them were also determined. The average "true" digestibilities of the protein of the "green"-fed and "dry"-fed rumen bacteria were found to be 62.1 and 64.8 respectively. These were not significantly different from each other, but very much lower than that obtained for the casein, namely 101.2.

The mean biological values found for the "dry"-fed rumen bacterial protein, the "green"-fed rumen bacterial protein, and the casein were 77.9, 79.9, and 79.6 respectively, when fed as the sole source of nitrogen in the ration at levels of 9.2, 9.7, and 9.5 per cent. crude protein (Nx 6.25).

The crude protein content of the "green"-fed bacterial sample was 47.6 per cent. and of the "dry"-fed 50.9 per cent. on the dry basis. These samples and their protein preparations were found to be very similar to cystine content in relation to the total nitrogen present, but the former was appreciably richer in methionine.

These findings were compared with those of other workers with similar material, with other microorganisms, and with other sources of protein, and are discussed in relation to the problem of the utilization of microbial protein by the ruminant.

It is concluded that judged by results with growing rats, rumen bacterial protein must be regarded as low in digestibility, relatively high in biological value, but mildly deficient in methionine.

PHILLIPSON, A. T., GREEN, R., REID, R. S., & VOWLES, L. E. (1949.) **The passage of**

food through the abomasum of the sheep.

—*Brit. J. Nutrit.* 3. pp. iii-iv, only abst. given. 2037

The volume of food passing from the abomasum of the sheep was about 400 ml. per hour. Duodenal flow of animals fed predominantly on hay amounted to 400—450 ml. per hour. From chlorine and dry matter determinations of the fluids obtained from various parts of the alimentary tract it was calculated that 50 per cent. of the abomasal fluid was gastric juice. The concentration of volatile acids in the duodenal material collected from animals on different diets was also estimated.

—E. EDEN.

HARPUR, R. P., & QUASTEL, J. H. (1949.)

Relations between acetylcholine synthesis and metabolism of carbohydrates and d-glucosamine in the central nervous system.—*Nature, Lond.* 164. 779-782. 2038

In vitro experiments indicate that for acetylcholine formation adenosinetriphosphate synthesis and hence an intact diphosphopyridine nucleotide system are necessary. d-Glucosamine has an inhibitory action by removing adenosinetriphosphate, whereas N-acetylglucosamine, which is an inhibitor of d-glucosamine, reverses its action. The presence of nicotinic acid amide in the extract is also necessary, as this inhibits the diphosphopyridine nucleotidase present and thus preserves a sufficient concentration of diphosphopyridine nucleotide.—E. EDEN.

STEFFEE, C. H. (1950.) **The relationship of protein depletion to natural resistance.** — *J. infect. Dis.* 86. 12-26. [Author's summary and conclusions copied verbatim.] 2039

Forty-two young roosters were depleted of their protein stores by prolonged feeding of a diet almost free of protein. The resistance of these animals, in comparison with that of birds fed on adequate diet, to pneumococcal infection was investigated. The mortality, phagocytic, temperature, and leucocytic responses to infection were studied. The serums were tested for antipneumococcal substances *in vivo* and *in vitro*. Agglutinin and complement titers were determined before infection. The conclusions are as follows:—

(1) Only one of the group of 29 protein-depleted birds survived an infecting dose of pneumococci which was fatal to half of the normal birds. (2) Serums of protein-depleted birds show less mouse-protective action and are less potent bacteriostatic agents than are serums from normal birds. (3) Phagocytosis is depressed in the depleted birds as evidenced by their inability to clear the circulating blood of pneumococci, as well as the observation of retardation and ineffectiveness of phagocytosis by the Kupffer cells during the infection. (4) Although the depleted bird is usually hypothermic, a normal body temperature does not prevent fatality following injection of pneumococci. Further, among the control birds, survival can not be predicted from either the preinjection or postinjection temperatures. (5) Despite differences observed, the leucocyte response of both normal and depleted birds offers no clue as to the outcome of the infection or the fundamental mechanism of natural resistance. (6) "Natural" agglutinins were not demonstrated. (7) The complement titer does not decrease in the protein-depleted rooster.

GARNER, R. J. (1949.) **Availability of the magnesium of grass to the ruminant.** [Correspondence.]—*Nature, Lond.* 164. 458. 2040

Sterile grass powder was incubated for 36-72 hours. At pH 6.9, 80% of the total magnesium present was in the ultrafiltrable fraction; in those samples to which rumen organisms had also been added the percentage was 85. G. concluded that these organisms play a significant part in the liberation of magnesium from plant cells. Experiments on abomasal digestion are also recorded.—E. EDEN.

ALLCROFT, W. M. (1947.) **Seasonal hypomagnesaemia of the bovine without clinical symptoms. With special reference to the influence of climate on the level of serum magnesium and the incidence of clinical hypomagnesaemia.** —*Vet. J.* 103. 75-100. 2041

The results recorded are an extension of a previous communication [Allcroft & Green, *V.B.* 10. 695]. Seasonal variations in serum Mg were studied in a herd of

Hereford cows kept under open ranch conditions on a farm in Kent with no supplementary feeding and in calves born of this herd which received supplements of hay and cake. Observations were also made of ten of the cows which were moved to a Surrey farm and on an Ayrshire dairy herd in Berkshire. A consistent seasonal rhythm in the serum Mg was found. Low levels, sometimes less than 1 mg% occurred between December and April, and maximal values about July and August. The rate and extent of the fall varied from year to year. Administration of 160 g. of MgO per head daily reduced the extent of the seasonal fall, but was less effective in maintaining normal serum Mg levels than was a supplement of 60-90 lb. of cabbage per head, which was given during a period of stormy weather. It is suggested that the serum magnesium is under endocrine control. The possibility that the thyroid and pituitary glands are involved is discussed in relation to the relevant literature.—E. M. CRUICKSHANK.

O'MOORE, L. B. (1950.) **Aphosphorosis in Ireland.** [Correspondence.] — *Nature, Lond.* 165. 192. 2042

"Bog crook," a chronic cattle disease indigenous in parts of Ireland, had been shown to be caused by phosphorus deficiency.

Determinations of blood inorganic phosphorus and of serum phosphatase were carried out on samples from clinical cases and from apparently normal animals grazing on the same farms, together with analyses of the herbage. Thus it was established that both the sub-clinical and the clinical form of aphosphorosis (the former characterized by the absence of any significant rise in serum phosphatase) are widespread in districts where the phosphorus content of the pasture is low.

A more spectacular rise in blood inorganic phosphorus was obtained by transferring the cattle to phosphorus-sufficient pasture than by merely feeding a phosphate supplement.—G. P. MARSHALL.

EDEN, E. (1949.) **Vitamin A deficiency in farm animals.** — *Vet. Rec.* 61. 845-851. 2043

In this review of the literature each

species is discussed separately. An account is given of experimental studies on cattle, sheep, pigs and poultry. A brief summary of symptoms in natural and induced deficiencies indicates that impairment of night vision and keratinization of epithelial cells with consequent decrease in resistance to infection occur in all the species studied. In the late stages of vitamin A deficiency reproductive function is damaged. An attempt is made to assess the requirements of the different species for vitamin A and a table indicates the data at present available. A very useful list of references completes the paper.

—A. M. COPPING.

PAUL, H. E., & PAUL, M. F. (1946.) **The relation of vitamin A intake to length of life, growth, tooth structure and eye condition.**—*J. Nutrit.* 31. 67-78. 2044

Albino rats 28 days old were given a vitamin A deficient diet until loss of weight and xerophthalmia occurred. They were then divided into four groups and received daily supplements of 1, 2, 4 or 20 U.S.P. units of vitamin A per 100 g. body weight, the doses being adjusted weekly according to weight increase. Some animals in the group receiving 4 U.S.P. units were given tocopherol in addition, to ascertain if the basal diet was adequate in vitamin E; this appeared to be the case. The average age of death of rats receiving 1, 2, 4 and 20 U.S.P. units was 80, 234, 521 and 649 days, respectively. Growth was moderate on an intake of 4 U.S.P. units; 20 U.S.P. units gave slightly better growth than did 4 U.S.P. units. Teeth and eyes were normal only on an intake of 20 U.S.P. units, but it was considered that normality would have been attained at a level intermediate between 4 and 20 U.S.P. units. From the relationship between vitamin A intake, life span and body weight, it is estimated that the requirement of the rat is about 10 U.S.P. units per 100 g. body weight.

—E. M. CRUICKSHANK.

EDEN, E. (1948.) **The absorption of vitamin A from colostrum by lambs.**—*Brit. J. Nutrit.* 2. 42-46. 2045

Vitamin A was estimated during the first four days after parturition in the colostrum of nine Suffolk ewes, which

were maintained on pasture, supplemented by hay and roots. Simultaneous estimations were also made on the serum of the ewes and their lambs. Samples were taken either immediately after parturition and before suckling started, or within 12 hours of the commencement of suckling. The total volume of colostrum secreted by the individual ewes was about 200 ml. Samples collected during the 12 hours following parturition contained from 1,340 to 2,080 I.U. per 100 ml. Subsequent samples contained progressively less, and at 48 hours values of 85-510 I.U. were observed. In new-born lambs, the serum contained only 15-24 I.U. of vitamin A per 100 ml. Within 12 hours of the ingestion of colostrum, the content increased to 47-225 I.U., but after two days fell again to the original level. The vitamin A content of the serum in the ewes, which ranged from 47-112 I.U., remained relatively constant throughout the experiment.—E. M. CRUIKSHANK.

BOWLES, L. L., LANE, A., SYDENSTRICKER, V. P., HOCK, G. W., & HALL, W. K. (1946). **The development and demonstration of corneal vascularization in rats deficient in vitamin A and in riboflavin.** — *J. Nutrit.* **32**. 19-35. 2046

A technique is described for preparing and photographing the intact cornea after injection with Indian ink to demonstrate vascularization. The normal variation in the cornea was studied with the biomicroscope in 500 rats of the Wistar strain, of all ages from weaning to maturity. The changes resulting from a deficiency of riboflavin and of vitamin A, and the regression of these during cure of deficiency were also investigated. Excellent photographs are provided. In riboflavin deficiency, vascularization was extensive; the pattern was sometimes dendritic, but more usually of the terminal loop type. In vitamin A deficiency, conjunctival oedema and congestion preceded the development of xerophthalmia. Vascularization was as a rule of the dendritic type. In both these deficiencies, photophobia was noted from the time that the first ocular changes were visible. For development of the characteristic corneal changes, it was important that the rats should not be too young and

that the diet should contain traces of the vitamin being studied.

—E. M. CRUIKSHANK.

TOSIC, J. (1949.) **Effect of small quantities of a yeast preparation on the recovery of appetite in sheep.**—*Brit. J. Nutrit.* **3**. 234-241. 2047

In an experimental flock of 15 sheep maintained wholly on hay, three developed a loss of appetite and weight which was arrested by dosing with yeast extract through a rumen fistula. Attempts to induce loss of appetite by dosing with active charcoal or sulphathiazole were unsuccessful.—P. H. HERBERT.

VAUGHAN, K. L. (1949.) **The treatment with vitamin B₁ of bracken staggers in the bovine.** [Correspondence.] — *Vet. Rec.* **61**. 693-694. 2048

Aneurin therapy in 100 mg. doses was adopted on two farms, nine animals being treated. Three recovered and these had no symptoms of bracken poisoning other than a rise in temperature. It is concluded that vitamin B₁ therapy is of no value in cattle except in very early cases.

—G. V. LAUGIER.

PEARSON, P. B., PERLZWEIG, W. A., & ROSEN, F. (1949.) **The metabolism of niacin in ruminants (sheep, goats, and calves).**—*Arch. Biochem.* **22**. 191-194. —*Abst. in Nutr. Abstr. Rev.* **19**. 332. (1949). 2049

Mature sheep and goats and also calves, aged 1-2 months, were given for three days 2 g. of nicotinamide. Irrespective of whether the substance was fed by mouth or injected subcutaneously, there was a slight increase in the excretion of N'-methylnicotinamide in the urine. A slight increase in the excretion of pyridone compounds was also noted in the case of sheep and goats, but not in calves.

—E. EDEN.

DYKE, W. J. C., HIND, H. G., RIDING, D., & SHAW, G. E. (1950.) **Bacterial synthesis of vitamin B₁₂ in the alimentary tract.**—*Lancet*. **258**. 486-488. [Authors' summary copied verbatim.] 2050

The vitamin B₁₂ growth-promoting

activity for *L. Lactis* Dorner and *L. leishmannii* in meat is not increased by incubation with normal gastric juice. The presence of vitamin B₁₂ in the contents of the alimentary canal at various levels in man and animals is established and its amount is shown to be greatest below the ileocaecal valve. Purified extracts made from intestinal contents are shown to be active in the treatment of pernicious anaemia when given parenterally. It is suggested that in man the normal requirements of vitamin B₁₂ are met by bacterial synthesis in the colon. Some advantage is undoubtedly to be gained by supplementing this with food stuffs rich in vitamin B₁₂.

STOKSTAD, E. L. R., & JUKES, T. H. (1950.) **Further observations on the "animal protein factor."**—*Proc. Soc. exp. Biol.*, N.Y. **73**. 523-528. [Authors' summary copied *verbatim*.] **2051**

Fermentation products of *Streptomyces aureofaciens* were found to promote growth in depleted chicks on various diets which were adequately supplied with vitamin B₁₂. Growth responses in chicks on a corn-soybean diet were also produced by crystalline aureomycin hydrochloride and by cultures in which the aureomycin, as measured by antibiotic potency, was destroyed by alkaline hydrolysis. Responses were also obtained with succinyl-sulfathiazole, streptomycin and 3-nitro-4-hydroxyphenylarsonic acid, but these substances appeared less potent than aureomycin. No responses were obtained with dried whey or dried brewer's yeast.

ERSNOFF, B. H. (1948.) **Conditioning factors in nutritional disease.**—*Physiol. Rev.* **28**. 107-137. **2052**

Absorption of fat soluble vitamins may be impaired on low fat diets, in pathological conditions when fat absorption is interfered with or bile secretion diminished, and when liquid paraffin is ingested. Diseases of the intestinal tract may interfere with absorption of water soluble vitamins. Absorption of calcium is favoured by adequate vitamin D intake, acidity in stomach and duodenum, absence of axalate-containing green food (e.g. spinach, beet tops) from the diet, and

absence or low intake of phytic acid and sodium phytate. Excessive phosphorus, magnesium or potassium intake, especially on low calcium diets, may interfere with calcium absorption; high fat diets or conditions of impaired fat absorption cause poor absorption of calcium. Absorption of phosphorus may be prevented by excess of cations in the diet which form insoluble phosphates; large doses of iron may have this effect. Alkalinity of the alimentary tract and excess of phosphorus in the diet interfere with iron absorption. There is some evidence of inhibition of protein digestion in foodstuffs such as soya bean and cocoa. Endocrine malfunction may interfere with carbohydrate absorption. Destruction by bacteria of vitamins in the intestinal tract may occur, e.g. in achlorhydria with resultant alkaline conditions, or by the ingestion of certain foodstuffs, e.g. destruction of thiamine by thiaminase in raw fish, fixation of biotin by combination with avidin in raw egg white.

Utilization of vitamins may be adversely affected by factors interfering with their conveyance, their concentration in certain organs, their conversion to physiologically active substances; thus liver dysfunction, hypothyroidism, low protein intake, ingestion of sulphonamides, radiation sickness, may interfere with vitamin function in these ways. Inhibitory structural analogues also compete with vitamins causing deficiency effects. There is evidence of impaired calcium utilization when soluble magnesium salts are ingested. Excessive loss of dietary essential substances may occur in cases of great fluid loss, by kidneys, by sweating, by lactation or by bleeding. Loss of protein or specific amino acids occurs in some pathological conditions. Increased requirements of vitamins have been reported in fever, strenuous exercise and hyperthyroidism. In pregnancy and during lactation the requirement of thiamine, riboflavin, ascorbic acid, protein and calcium is increased.

Dietary constituents, such as certain amino acids, ascorbic acid, thiamine, riboflavin, pyridoxine, p-aminobenzoic acid, by combining with toxic substances in the body, may give rise to a deficiency of these vitamins. An increased requirement for

thiamine, riboflavin and nicotinic acid has been demonstrated in conditions of shock and anoxia.

Certain factors such as sunlight, skin irritation, high temperatures, altitude, administration of glucose, etc., may accelerate the onset of deficiency symptoms in cases of borderline nutritional state.—R. MARSHALL.

OLSSON, E. (1947.) Naagra synpunkter paa den puerperala acetonämiens profylax och terapi. [Prevention and treatment of puerperal acetonaemia.] — *Svensk. VetTidskr.* 52. 277-282. 2053

The author described the treatment and prevention of puerperal acetonaemia in cows, a disease which causes much trouble in Sweden. Carlström's vitamin B therapy has been much used, particularly a proprietary concentrated product called Adynol comp. which is given by intravenous injection. It causes immediate shock so must be injected in fractional doses with or without glucose. Ordinary cases usually respond rapidly, but there is

a severe form which the author calls acetonaemia gravis, which does not. Another vitamin preparation, "ewomin," and also cobalt were effectively used.

For prophylaxis cows are given from one month before calving molasses with "ewomin" and corn grits, and from two weeks before calving food concentrates and the ration of these is increased gradually after calving, A.I.V. silage being added also.—J.E.

PULLAR, E. M. (1950.) **Nutritional abortion and stillbirths in Victorian pigs.**—*Aust. vet. J.* 26. 4-8. [Author's summary copied verbatim.] 2054

The literature relating to nutritional abortion and stillbirths in sows is briefly reviewed. The occurrence of this condition in ten Victorian herds is described and the possible etiology discussed. All herds were free from brucellosis. In all herds the intake of calcium, protein and vitamin A was low. As far as could be determined, the trouble ceased in every herd immediately after the diet was corrected.

See also absts. 2024 (dietary fat and carcinogenesis); 2025 (vitamin B and tumours); 2098 (vitamin P); 2155 (report, W. Australia).

DISEASES, GENERAL

VON GLAHN, W. C., & HALL, J. W. (1949.) **The reaction produced in the pulmonary arteries by emboli of cotton fibers.**—*Amer J. Path.* 25. 575-595. 2055

In the routine examination of sections of lungs from necropsies over a period of 20 years, the authors observed, as an incidental finding in six cases, foreign bodies in the smaller branches of the bronchial arteries. Study of the case histories revealed one feature common to all: each of these patients had received one or more intravenous injections of physiological saline, glucose solution or blood not more than ten days before death. Considering this common factor and the nature of the lesions, the authors concluded that the bodies might be fragments of cotton wool injected with the fluids and designed the following experiment to test their hypothesis. Minute fragments of absorbent or non-absorbent cotton wool in physiological saline, the whole sterilized, were injected into the iliac veins of 62

adult albino rats. Groups of rats were killed at intervals of from 12 hours to six months and their lungs studied microscopically. Lesions produced are described in detail: there was no difference between the lesions produced by absorbent and by non-absorbent cotton wool fibres; foreign body granulomata were formed; there was neither thrombosis nor hæmorrhage, nor did the cotton embolisms and granulomata lead to infarction.

—L. M. MARKSON.

FRENCH, J. (1950.) **Glomerulonephrosis. A morphologic manifestation of renal cortical ischemia in toxic oliguria and lower nephron nephrosis.**—*Arch. Path.* 49. 43-54. [Author's summary slightly amended.] 2056

Glomerulonephrosis is presented as the glomerular manifestation of renal ischemia in toxic oliguria or anuria and the so-called lower nephron nephrosis. This renal change is of common occur-

rence and is found in varying degrees of severity.

Protein casts and gray staining with the hematoxylin and eosin method, are a significant morphologic finding.

The state of the liver is related to this renal condition and it is suggested that the hyperglobulinosis present in advanced hepatic disease may be a contributing factor.

The reversibility of the changes that occur in the glomeruli and tubules in glomerulonephrosis is indicated by the possibility that some patients may recover from eclampsia as well as from toxic oliguria or anuria.

HAMA, G. M. (1949.) **Ultra-violet exposure from germicidal lamps.**—*Industr. Med.* 18. 75-76. [Abst. in *Bull. Hyg., Lond.* 24. 595. (1949), copied *verbatim*. Signed: E. L. COLLINS.] 2057

Ultra-violet lamps of the low pressure mercury type, emitting radiation in the region of approximately 2,000 to 3,000 Angström units and producing their major output at 2,537 Angström units, exert a powerful bactericidal and fungicidal effect. They are used in the meat industry, the baking industry, breweries, restaurants and eating places. In the meat industry at temperatures of 34° to 38°F. the absolute humidity is low and the meat loses both weight and juices. With the use of germicidal lamps temperature in coolers may be kept at 40° to 45°F. with great advantage to the meat. In the baking industry the warm atmosphere maintained in the dough room to promote the fermentation and growth of yeast provides ideal conditions for the growth of moulds. Germicidal lamps control such contamination by irradiation of the dough room, of baked goods passing from oven to cooling room, of the product on the cooling racks, and of the place where the goods are wrapped. They are also of great value for sterilizing glasses in canteens, for sterilizing air in hospital operating rooms, and for preventing moulds in brewing and in other processes.

But excessive exposure to ultra-violet radiation, after a few hours' delay, causes deep-seated pain in the eyes, conjunctivitis, and difficulty in focussing the

eyes, with, at times, temporary blindness. Recovery may take several weeks. The skin of exposed parts may be reddened and burnt. Instances are quoted (a) of pains and burning eyes with headaches and blurred vision due to exposure to ultra-violet lamps for sterilizing drinking glasses placed below the serving counter; eleven serving-girls complained; and (b) of red and sunburnt hands affecting six girls in a bakery directly after germicidal lamps had been installed. All that is required is understanding and care in the installation and use of these lamps, for instance, meat stores can be so arranged that when the doors are opened for entry the current to the lamps is cut off. Generally, it should be arranged that no one adjacent to a lamp should normally be able to see it, either directly or by primary reflection from specular reflecting surfaces. Common glass, cloth, wood, metal or plastic partitions can be used as shields. The face and eyes may be shielded by glass or plastic goggles, or plastic face shields.

NILSSON, F. (1947.) Hästens goniter. [Gonitis in horses.]—*Svensk VetTidskr.* 52. 1-14. 2058

Diseases of the stifle joint in horses account for about 6% of all insurance claims in Sweden and it is estimated that nearly one thousand cases in insured and uninsured horses occur each year.

N. gives a systematic description of the principal types of gonitis, excluding that type which is part of the joint-ill syndrome. He deals with luxation of the patella, traumatic gonitis, allergic or rheumatic gonitis, suppurative gonitis (open joint) and chronic deforming gonitis.—J. E.

I. LUKES, J., & CECHE, K. (1948.) Zdráská nemoc v jižních Čechách. [The Zd'ár disease in South Bohemia.]—*Cas. ceskoslovensk. Vet.* 3. 367-384. [English, French and Russian summaries.] 2059

II. POKORNÝ, B. (1948.) Serologická vyšetřování koní stížených zd'árskou chorobou. [Serological examinations of horses affected with Zd'ár disease.]—*Cas. ces. lék.* 23. 689. [Abst. from

abst. in *Cas. ceskoslovensk. Vet.* **4**. 219-220.] **2060**

III. POKORNÝ, B. (1949.) Serologická vyšetřování koní stížených zdárskou chorobou. [**Serological examinations of horses affected with Zdár disease.**]—*Cas. ceskoslovensk. Vet.* **4**. 345-355. [English, French and Russian summaries.] **2061**

I. A condition in horses, known in Czechoslovakia as Zdár disease is described. Zdár is a town in Southern Bohemia. It is stated that it is likely that the disease is a sequel to or a late stage of a leptospiral infection. This disease is associated with bouts of sweating and mild attacks of colic, in the early stages. These symptoms, regarded as petty, are easily overlooked. Soon illness becomes manifest with loss of appetite and unusual behaviour such as crib biting, licking of metal objects, frequent yawning, apathy, leaning and pushing against walls, stumbling and moving in circles. In the later stage there may be excitement with kicking and rearing.

Owing to the almost latent early stage the total length of the illness cannot be estimated. The late stage may last from a few days to several weeks and results in death. It has resemblance with poisoning by senecio and certain plants, "Schweinsberg disease," "Leberkoller" and selenium poisoning. P.M., the liver is found to be enlarged up to double or treble its normal size and there are the cirrhotic hobnailed type of liver lesions. Livers of unborn foals of dams that had died of Zdár disease were normal.

A horse that had been imported from Denmark was inoculated with blood from a horse in the late stage of the disease and housed in a stable that had recently been used for affected horses, but it remained healthy. In order to differentiate the disease from equine infectious anaemia blood taken during a fever period from a horse, which is described as an atypical case, was injected into a foal without producing either E.I.A. or Zdár disease.

In agglutination tests against *L. grippo-typhosa* titres of 1 : 10,000—1 : 50,000 were given with serum from nine horses affected with Zdár disease.

Leptospira could not be demonstrated

in the blood or tissues of affected horses. Attempts to set up the disease in laboratory animals yielded negative results.

II. Blood sera from 210 affected horses were submitted to the agglutination test against *Leptospira*. 71 agglutinated *L. grippo-typhosa*, 48 *L. icterohaemorrhagiae*, 18 *L. sejroe*, 17 *L. australis* and three *L. oryzei*. P. suggests that the higher incidence of reactions to *L. icterohaemorrhagiae* was accounted for by the normal rat infestation of the stables. *L. grippo-typhosa* and *L. sejroe* are common infections in human beings in the district. There is no further evidence to support P.'s suggestion that *L. grippo-typhosa* and *L. sejroe* may be the cause of the disease.

III. Sera from 504 horses were examined, of which 255 were affected or suspected horses, 192 from healthy horses and 57 from horses with doubtful case histories. 70 per cent. of the sera from infected and suspected horses, 35 per cent. of those from the healthy and 52 per cent. of those from the doubtful ones agglutinated leptospira. In healthy horses there were titres of 1:1,000, in infected and suspected ones the titres varied from 1:10,000—1:50,000. The antigens used were those of *L. icterohaemorrhagiae*, *L. grippo-typhosa*, *L. sejroe*, *L. canicola* and *L. bovina*. The majority of sera agglutinated *L. grippo-typhosa*; it is suggested that this might be of significance as there is endemic human leptospirosis in the district. The sera which did not agglutinate any of the mentioned strains were from horses that had been brought from other parts of Czechoslovakia.—E.G.

FARLEY, H., KIEWER, I. O., PEARSON, C. C., & FOOTE, L. E. (1950.) **Infectious keratitis of cattle — a preliminary report.**—*Amer. J. vet. Res.* **11**. 17-21. **2062**

Application of 24 hour cultures of *Hæmophilus bovis* to the conjunctiva of cattle, rabbits and g. pigs failed to produce keratitis. Application of secretion from field cases reproduced the disease within three days in cattle. *H. bovis* isolated from the cases was not pathogenic. It would seem that *H. bovis* is not the primary aetiological factor. Treatment is symptomatic.—L. M. MARKSON.

SCHOFIELD, F. W., & JONES, T. L. (1950.) **The pathology and bacteriology of infectious atrophic rhinitis in swine.**—

J. Amer. vet. med. Ass. **116.** 120-123. **2063**

The pathology of the condition is described; the most prominent lesion is atrophy of the turbinate bones. The authors consider that the transmissibility of the disease has been established, but the causative agent has not been demonstrated.—D. LUKE.

LIEBISCH, H. (1947.) Aetiologische und histologische Untersuchungen über das enzootische Myxödem der neugeborenen Ferkel. [**Enzootic myxœdema of the new-born piglet.**]—*Inaug. Diss., Vienna.* [Abst. from abst. in *Wien. tierärztl. Mschr.* **36.** 44-45. (1949).] **2064**

Litter of piglets affected with myxœdema were examined. Many were still-born, the remainder died within a few hours after birth. In the ones that lived for a short time there was cretinism, dyspnœa, hoarseness and lack of hair. In most cases pregnancy had been longer than normal by up to ten days and there had been difficult labour. In 13 piglets examined P.M. there was œdema in the region of head and neck. Bacteriological tests were negative. Histological examination of the thyroid glands revealed that the nuclei of cells of the cylindrical epithelium were large and light in colour. There was stenosis of the lumina of follicles which were free from colloids. There was hyperæmia but no endocrine secretion.

As a prophylactic measure pregnant sows were given during the second half of pregnancy a daily dose of three minims of a 1% solution of potassium iodide or 3 g. of "thyreosan-sanabo" [composition not given]; the young of these pigs were normal.—E.G.

HEIDEBRECHT, A. A., ROSS, O. B., WHITEHAIR, C. K., & MACVICAR, R. W. (1950.) **The toxicity and nutritional adequacy of milk from sows suckling pigs showing symptoms of baby pig disease.**—*J. Amer. vet. med. Ass.* **116.** 147-148. **2065**

Milk was collected from sows with litters in which there was a high incidence of baby pig disease, and fed to weanling

rats. Groups of rats fed with milk from a normal sow and from a Jersey cow were used as controls. As judged by the physical appearance and the growth of the rats, the milk from the experimental sows was nutritionally adequate and non-toxic.

—D. LUKE.

KLARENBECK, A., KOOPMANS, S., & WINSSER, J. (1942.) Een aanvalsgewijs optredende stoornis in de regulatie van de spiertonus, waargenomen bij schotsche terriers. [**A progressively developing muscular disturbance encountered in Scottish terriers.**] — *Tijdschr. Diergeneesk.* **69.** 14-21. [English, French and German summaries.] **2066**

The authors describe in detail a muscular derangement, in five Scottish terriers, of which no mention could be found in the veterinary literature.

The first signs of disturbed muscular control were noticed when the animals were 3-6 months old and were most marked when the animals were exercised out of doors and had been walked for some distance. The muscular spasms developed first in the hind limbs; movements were jerky, the animal beginning to hop along on one leg with the other drawn up; the back was arched in the lumbar region; the front limbs became involved; there were spasms of the cervical muscles; the head was pulled down until the nose touched the ground and the animal somersaulted. In bitches the condition was aggravated by œstrus and attacks might be provoked by pulling the animal by the collar. The authors state that this disorder is not identical with myotonia congenita (Thomsen's disease of man and goats) or with paramyotonia congenita in man, which is claimed to be closely connected with low air temperatures. There was no proof that it was a hereditary disease. They attribute it to a functional disturbance associated with the nucleus ruber and suspect that it may be associated with a breed degeneration. The condition occurred spontaneously at an early age.

—P. L. LE ROUX.

See also absts. 1959 (X disease); 1969 (a tick-borne fever in cattle); 2042 ("bog crook"); 2155 (report, W. Australia).

POISONS AND POISONING

ALBERT, A. (1950.) **Selective toxicity.**
—*Nature, Lond.* **165.** 12-16. **2067**

Selective toxicity is defined by the author as "the science of injuring certain kinds of living cells without harming other kinds of cells in the vicinity." On a large scale this process includes the use of phenyl mercuric nitrate as a fungicidal seed-dressing, methylchlorophenoxy-acetic acid as a weed-killer, D.D.T. as an insecticide, and a variety of agents used in chemotherapy. The mode of this selective action is the main subject of this article. In the case of sulphuric acid used to remove chickweed from a wheat crop the explanation is simple—the acid accumulates on the rough chickweed and is shed from the smooth wheat plants. Certain agents act by virtue of the varying biochemical properties of living tissues; thus penicillin prevents the absorption of glutamic acid by those bacteria which it injures most. Staphylococci are dependent on an external source of this acid, whereas human tissues and types of bacteria least susceptible to penicillin can synthesize their own needs of this acid. A number of hypnotics and anæsthetics exert the same degree of biological action when present at the same proportional saturation; their selective action at particular sites is therefore a result of their high concentration at such sites. Ionization, the binding of trace metals, and the formation of co-valent bonds are some of the ways in which selective toxicity may be exerted.

Trypanosomes which are susceptible to arsenic combine with this drug and remove it from solution, whereas arsenic-resistant parasites are not killed by trivalent arsenic and leave a residual solution which will still kill susceptible trypanosomes. The parasites killed by arsenic were found to contain considerable amounts of arsenic whereas the resistant parasites contain none. Fixation of drugs by parasites has also been demonstrated during circulation in the host's blood stream in the case of trypaflavine, antimony, gold and arsenic. But the mere uptake of drug by a parasite does not necessarily indicate toxicity. Atebrin, trypaflavine and rivanol, for instance, are taken up by malarial parasites

and by trypanosomes, but whereas the first drug harms only the malarial parasite, the second affects only the trypanosomes and the third injures neither. Chemotherapeutic drugs act directly on the parasite and this reaction is chemical in nature and is often brought about by two distinct reacting groups, aided by the natural defence factors of the body which play their part when the drug has disturbed the metabolism of the parasite.—E.G.W.

McLETCHE, N. G. B., & ROBERTSON, H. E.
(1949.) **Nitrate poisoning from well-water.**—*Canad. med. Ass. J.* **60.** 230-233. **2068**

Two fatal cases of methæmoglobinæmia are recorded in infants in the sixth week of life from the use of well water with a high nitrate content. P.M. examination and tests on the well water gave the following results:—case (1) 44% of the hæmoglobin was found to be in the form of methæmoglobin and the well water had a nitrate content of 1,320 p.p.m.; case (2) blood pigments examined by standards available gave a methæmoglobin content of the blood of more than 25%, and the well water tested for nitrate and nitrite gave results of 1,219 p.p.m. and 12.6 p.p.m. respectively.

The possible factors involved in the development of nitrate methæmoglobinæmia in infants are discussed.—R.G.

LANG, P. S., TULLOH, N. M., & FENNESSY, B. V.
(1949.) **A note on the occurrence of chronic copper poisoning in sheep in the Western District of Australia.**—*Aust. vet. J.* **25.** 267-269. **2069**

During a survey of the sheep industry in the Western District of Victoria some information was obtained about the occurrence and incidence of enzootic jaundice of sheep. The disease was recorded on 14 out of 150 farms visited and on a further 19 farms there was doubt as to whether the condition was present. Data are presented, relating the occurrence of the disease to the dominance of subterranean clover in the pasture. Only one of the 14 "positive" farms visited carried Merino sheep alone.

—J. D. STEEL.

BECKER, K. (1949.) Ueber Haustierverschüttungen durch Rattengiftköder und die Frage, ob Wildratten erbrechen. [Poisoning of domestic animals by rat poison. Do wild rats vomit?—Berl. Münch. tierärztl. Wschr. No. 8. pp. 101-104. 2070

As a result of a questionnaire sent to veterinary practitioners B. concluded that cases of poisoning in domestic animals (dogs, cats and poultry) follow the laying of poison bait for rats (Zn. phosphide or thallium sulphate), but that such occurrences are not common and are usually caused by failure to observe the ordinary precautions. Some correspondents stated that rats which have ingested poison bait are said to go to water troughs where they drink water and then at once vomit into the trough. This alleged vomiting might constitute a danger to horses or cattle, or to man in cases where bait was laid for rat destruction on premises where food is kept.

Experiments on both wild and house rats indicated that injection of varying doses of apomorphine (6.7 - 13.2 mg. per 100 g. body weight) into unanæsthetized animals failed to produce vomiting. The symptoms observed were dilatation of the pupils, uneasiness, biting and licking. One rat was seen to spend some two hours contentedly consuming its entire tail: there was little loss of blood, the wound healed rapidly, and the animal recovered completely.—E. G. WHITE.

SPITZNER, R. (1947.) Sobre a dosagem de fluor em águas potáveis. [Determination of fluorine in drinking water.]-Arq. Biol. Tec., Curitiba. 2. pp. 233-264. [English summary.] 2071

For the estimation of F in water, a colorimetric test was used in which the water was treated with a mixed solution of zirconium nitrate and alizarin blue in acid medium, the resulting tint being compared with that obtained with a solution of sodium fluoride of known concentration similarly treated. With this test many samples of Brazilian water were examined. Most of them contained very little F and none had excess.

The teeth of certain animals were also

tested, but fluorosis was present in none except in rats artificially fed with F.—J.E.

GARNER, R. J. (1949.) Experimental toxicity of sodium fluoride. — Vet. Rec. 61. 865. 2072

In the use of sodium fluoride in the treatment of ascariasis in pigs, local necrosis may be caused if the drug enters a wound in the epidermis, such wounds taking slightly longer to heal, but no other abnormalities were noted and only reasonable precautions need be taken by those handling it.—E. EDEN.

NICHOLS, H. C., THOMAS, E. F., BRAWNER, W. R., & LEWIS, R. Y. (1949.) Report of poisoning two dogs with 1080 rat poison (sodium fluoroacetate).—J. Amer. vet. med. Ass. 115. 355-356. 2073

Sodium fluoroacetate was used extensively in the city and county of Ocala, Florida, for the destruction of rats, and cases of poisoning in dogs were suspected by the authors to be caused by this agent. Two dogs given experimentally a solution of "1080" containing 28 mg. of sodium fluoroacetate had symptoms of extreme pain, convulsions, and opisthotonus and died within four hours of being given the rat poison. The animals died within 30 min. of the occurrence of symptoms. Two suspected cases of natural poisoning resulting from the ingestion of small doses of the poison recovered when given protracted deep anæsthesia with sodium pentothal and intravenous injections of glucose.

The use of the poison in the county was discontinued.—E. G. WHITE.

NOLAN, M. O., & BERRY, E. G. (1949.) Preliminary field trials with laboratory-tested molluscicides.—Publ. Hlth. Rep., Wash. 64. 942-949. 2074

A large number of chemicals, principally organic compounds, which had shown toxicity against *Australorbis glabratus* were used in field trials against snail populations consisting mainly of the related *Tropicorbis obstructus*. Measured sections of large ponds or ditches were treated with the molluscicides dissolved in acetone and/or alcohol or in emulsion, a concentration of 10 p.p.m. being used in all cases.

Two compounds, the hydrated sodium salt of pentachlorophenol (dowicide G) and pentabromophenol showed promise under field conditions, but both compounds are stated to be irritant to the human respiratory tract.—S. BRIAN KENDALL.

VAN DER WALT, S. J., & STEYN, D. G. (1946.) **Recent investigations into the toxicity of plants, etc., No. XV.**—*Onderstepoort J. vet. Sci.* **21.** 45-55. [For part XIV, see V.B. **17.** 203.] **2075**

Eighteen species of plants were tested for toxicity by feeding to sheep. Of these, four not previously known to be poisonous, proved to be toxic. These four were *Tetragonia Schenkii*; *Encephalartos Lehmannii*; *Moræa trita* var *foliata* and *Schizocarphus nervosus*. The pupæ of the insect *Melasma eircophora* were also tested and proved to be non-toxic to a rabbit.—M.C.

EDWARDS, C. M. (1949.) **Some observations on plant poisoning in grazing animals.**—*Vet. Rec.* **61.** 864-865. **2076**

Poisoning of grazing animals by ingestion of plants is usually associated with poor nutritional conditions causing the animals to eat material which is outside their normal dietary; an abnormal taste for the particular plant may then develop. Toxicity in the plant may increase under drought conditions. Cases of severe toxic effects of plants are recorded: poisoning by ragwort ingested by young cattle during drought; bloat caused by over-eating of clover or aftermath; symptoms of bloat in ewes moved from very poor pasture on to land where abundant young oak shoots were available; ingestion of *Equisetum palustre* in large quantities by cows turned out for the first time after the winter causing hyperexcitability, collapse and death; bracken poisoning in young cattle when other vegetation was scarce; ingestion of yew which, contrary to accepted belief, may be relatively harmless in small quantities.—R. MARSHALL.

GYARMATI, E. (1948.) *Veratrum mérgész lovak között.* [Veratrum poisoning of horses.]—*Magyar Allatorvosok Lapja.* **3.** 256-257. [Abst. in *Nutr. Abstr. Rev.* **19.** 496. (1949), copied verbatim. Signed: I. FINLAY.] **2077**
Consumption of hay containing *Veratrum* [a plant belonging to the *Liliaceæ*

family] caused severe poisoning in 8 horses. Cure was by stomach lavage.

WELLS, H. E. (1949.) **Bracken poisoning.**—*Agriculture, Lond.* **66.** 204-205. **2078**

Cases diagnosed as bracken poisoning occurred among cattle grazing on leys sown on land reclaimed from bracken-infested primeval forest. Although the leys were grazed in 1945 and in each succeeding year no serious trouble occurred until 1948, an extremely good year for grass. It seems that the stock of 700 cattle were unable to keep down the grass of 400 acres of reclaimed land, with the result that in August of that year the grass was lush and rank and the cattle ingested large amounts of bracken on adjacent land in order to satisfy their craving for fibrous material. Of the 741 cattle grazed in 1948, nine died on the leys, 11 died after removal to fresh grazing and seven recovered after having had symptoms. Large areas of standing bracken adjacent to the leys were eaten down to half their normal height.

—E. G. WHITE.

HORNBY, H. E., & ROBSON, J. (1950.) **Hydrocyanic acid in pasture plants.**—*Vet. Rec.* **62.** 1-2. **2079**

The East African fodder grass, *Cynodon plectostachyum*, is rich in hydrogen cyanide in all stages of growth. Three sheep fed exclusively on freshly cut *Cynodon* for two months relished the diet and thrived on it. When grouped with three sheep fed a cyanide free diet of *Setaria splendida* and cotton seed, all the animals were given doses of sodium cyanide which were gradually increased until the recognized minimum lethal dose had been exceeded. Until a dosage of 5 mg. per lb. body weight had been reached no serious or even obvious symptoms occurred in either group. At this dosage all the sheep except one, which was fed the *Cynodon* diet, were severely affected. The hydrogen cyanide in the *Cynodon*, even when augmented artificially, appears to be without harmful effects upon sheep under the conditions of this experiment.—R. MARSHALL.

JEAN-BLAIN, M. (1949.) *Intoxications de porcs par de la farine d'ers ervilier.* (*Ervum ervilia* L.) [Poisoning of pigs with flour consisting of ground up seeds

of a leguminous plant (*Ervum ervilia*)—*Rev. Méd. vét., Lyon et Toulouse.* **100.** 86-89. **2080**

It is stated that all portions of this leguminous plant are poisonous, especially the seeds, the active principle withstanding drying and haymaking.

Pigs and fowls are very susceptible, but ruminants and human beings appear to be resistant. In pigs there were no specific symptoms or P.M. lesions following ingestion of the substance; depression, coma, emesis and incoordination were des-

cribed. Death was attributed to action on the respiratory centre and to profuse hæmorrhage.

The author described one outbreak involving 11 pigs, of which seven died, on four farms. A sample of meal used was subjected to microscopic examination and the presence of *Ervum* confirmed. He points out that poisoning in pigs may occur if they are fed certain kinds of flour substitutes used by bakers in products meant for human consumption.

—R. J. FITZPATRICK.

See also absts. **2048** (bracken staggers); **2059-2061** (Zd'ár disease); **2094** (cobra venom and bacteria); **2155** (Kimberley horse disease).

PHARMACOLOGY AND GENERAL THERAPEUTICS

(For treatment of specific infections, see under the appropriate disease).

McMANUS, E. C., SCHEIDY, S. F., TILLSON, E. K., PITT, A. A., & KEMP, R. L. (1949.) **Distribution of sulfamerazine and sulfamethazine between blood and cerebrospinal fluid of calves.**—*J. Amer. vet. med. Ass.* **115.** 253-256. **2081**

It has been established that sulphonamides become bound to plasma proteins so that their levels in extravascular fluids such as lymph, synovial fluid, cerebrospinal fluid, etc. depend on the amount of unbound sulphonamide which can pass across the capillary wall. To examine this point further, sulphamerazine and sulphamethazine were injected intravenously into two groups of three calves each at the rate of 0.074 g. per kg. body weight. Analyses indicated that sulphamethazine maintained a higher plasma concentration than sulphamerazine, but the latter maintained a higher concentration in cerebrospinal fluid. This could be accounted for by the fact that up to 70.6% of the sulphamethazine was bound to plasma proteins compared with only 50% in the case of sulphamerazine.—J. A. NICHOLSON.

by weight of sulphadiazine at varying stages of pregnancy. It was found that when the treated food was fed from the 6th-8th day of pregnancy, the percentage of births fell to 23.2% as compared with 48.2% in a control group of mice.

—J. A. NICHOLSON.

DYRENDahl, S. (1946.) Om joderade proteiner med tyroxineffekt. [**Iodinated proteins with the activity of thyroxine.**]—*Svensk Vet Tidskr.* **51.** 175-182. **2083**

A short discussion of the literature on studies on the acceleration of metabolism by the administration of thyrotrophic substances. The thyroxine effect could, it was found, be obtained by feeding iodinated proteins such as casein and this substance could give increased milk yield to cows fed with it, but only at the expense of much energy output and consequent loss of body weight and even the production of artificial thyrotoxicosis.

In fowls, feather growth, maturity and egg production can be speeded up by the feeding of iodinated protein.

Antagonistic action is exerted by the thiouracils.—J.E.

BASS, A. D., YNTEMA, C. L., & HAMMOND, W. S. (1949.) **Effect of sulfadiazine on survival of the mammalian embryo.**—*Science.* **110.** 527-528. **2082**

Evidence has been obtained which suggests that sulphonamides may interfere with the early development of the mammalian embryo. To investigate this, breeding mice were given food containing 0.8%

WAKSMAN, S. A. (1948.) **Antibiotics.**—*Biol. Rev.* **23.** 452-487. [Author's summary copied *verbatim*.] **2084**

The phenomenon of antagonism or antibiosis among micro-organisms dates back to the early days of microbiology. The early studies made by students of mixed infections, of accidental contaminations of cultures, of the effects of one

organism or its metabolic products upon another, of the isolation of such products, and even attempts to utilize them for disease control, all represented a series of unco-ordinated observations rather than a system which would fit into a new and important branch of science. The new "antibiotic" age dates only to 1938-9, when a series of co-ordinated studies were made in several laboratories throughout the world.

Antibiotics, known previously as lysins, toxins, lethal principles, staling principles, etc., are characterized by certain important properties which distinguish them sharply from the common antiseptics and disinfectants. They are produced by micro-organisms, they are selective in their action upon bacteria and other micro-organisms, they vary in their chemical and physical properties, they differ in their mode of action and are affected differently by the composition of the substrate in which they act, they vary in their toxicity to animals, and, therefore, in their chemotherapeutic potentialities.

Antibiotics are produced alone or in mixture by different groups of micro-organisms, notably bacteria, fungi and actinomycetes. Some thirty or more antibiotics have now been isolated from each of these groups. Among the bacteria, the spore-forming aerobes are the most important, although cocci, Gram-negative and other bacteria have been found to yield important antibiotics, nisin having been isolated from streptococci, and pyocyanase, colicins, and a variety of other compounds from the Gram-negative rods. Among the fungi, the *Penicillium* and *Aspergillus* groups are most important, although the *Trichoderma*, *Chaetomium* and other groups, as well as various Basidiomycetes have been found to yield interesting compounds. Among the actinomycetes, the genus *Streptomyces* is most important, although the genera *Nocardia* and *Micromonospora* have also been found to produce interesting antibacterial substances.

Out of more than 100 antibiotics that have so far been isolated, only very few have found application as chemotherapeutic agents. These are penicillin, streptomycin and tyrothricin. Among the other more promising antibiotics, one may include bacitracin, subtilin, licheniformin, nisin, aerosporin, polymyxin and chloromycetin.

The introduction of antibiotics as chemotherapeutic agents has revolutionized medical practice. It has pointed a way to the treatment of infections that did not lend themselves previously to therapy. It has given rise to optimistic expectation that new agents will be found that will lend themselves to the treatment of numerous diseases which are still resistant.

Among the present-day problems in the field of antibiotics may be listed the development of resistance among bacteria on prolonged contact with the drug, the search for synergistic agents which would tend to overcome such resistance, a better knowledge of the mode of action of antibiotics, and a search for new antibiotics, notably those that are active upon infections, such as virus and tumour infections, and that do not lend themselves at present to chemotherapy.

OGINSKY, E. L., SMITH, P. H., & UMBREIT, W. W. (1949.) **The action of streptomycin. I. The nature of the reaction inhibited.**—*J. Bact.* 58. 747-759. 2085

SMITH, P. H., OGINSKY, E. L., & UMBREIT, W. W. (1949.) **The action of streptomycin. II. The metabolic properties of resistant and dependent strains.**—*Ibid.* 761-767. 2086

UMBREIT, W. W., & TONHAZY, N. E. (1949.) **The action of streptomycin. III. The action of streptomycin in tissue homogenates.**—*Ibid.* 769-776. [Authors' summaries copied *verbatim*.] 2087

I. Streptomycin specifically inhibits an oxidative reaction in susceptible strains of *Escherichia coli*. This reaction is apparently the "oxalacetate-pyruvate" condensation and when inhibited prevents a variety of substances from entering the terminal respiration system that resembles the citric acid cycle.

II. Resistant and dependent variants of the streptomycin-sensitive *Escherichia coli* do not possess the ability to effect the oxalacetate - pyruvate condensation in detectable amount. This is the reaction inhibited by streptomycin in the sensitive strains, and it appears that the ability to grow in the presence of streptomycin depends upon the development of unknown reactions permitting the cell to dispense with this condensation.

III. Streptomycin will inhibit the oxalacetate - pyruvate condensation in animal tissue as well as in the bacterial cell. In the intact animal permeability factors apparently prevent streptomycin from acting on the site of this reaction. These permeability barriers exist not only at the cell wall, but also at the mitochondria, and may be chemical as well as physical in nature. When the barriers are overcome, however, streptomycin does inhibit the oxalacetate-pyruvate condensation in animal tissue.

DOLL, E. R., & WALLACE, M. E. (1948.) **Dosage and blood level of streptomycin in sheep.**—*J. Amer. vet. med. Ass.* **113.** 55-59. **2088**

The concentration of streptomycin in sheep serum was measured by its effect in serial dilution upon growth of *Bacillus circulans* when compared with standard streptomycin dilutions. Following single intramuscular injections, the level of streptomycin in the blood was maintained for 1-2 hours, after which it fell. The effect of injections at three-hourly intervals was then tested and it was found that 0.25 mg. per lb. body weight maintained a serum concentration of between 1-2 units per ml., while increasing quantities gave increasing serum concentrations up to an injection of 2 mg. per lb. which gave 16-32 units per ml.—R. MARSHALL.

SWART, E. A., ROMANO, A. H., & WAKSMAN, S. A. (1950.) **Fradicin, an antifungal agent produced by *Streptomyces fradiae*.**—*Proc. Soc. exp. Biol., N.Y.* **73.** 376-378. [Authors' summary copied *verbatim*.] **2089**

An antibiotic, designated as fradycin and active only upon fungi, was isolated from the culture filtrate of the neomycin-producing *Streptomyces fradiae*. Fradycin is characterized by an antifungal spectrum, which includes saprophytes as well as plant and animal pathogens. It is stable to 100° C. for 30 minutes at pH 7.0. At more acid reactions, it is gradually destroyed. It is soluble in a number of organic solvents and has a characteristic absorption spectrum which differentiates it from other antibiotics.

SMITH, G. N., WORREL, C. S., & SWANSON, A. L. (1949.) **Inhibition of bacterial esterases by chloramphenicol (chloromycetin).**—*J. Bact.* **58.** 803-809. [Authors' summary copied *verbatim*.] **2090**

Studies on the mode of action of chloramphenicol at therapeutic levels indicate that the ability of this new antibiotic to inhibit the normal metabolic processes of pathogenic bacteria may be related to its inhibitory action on esterase. Data have been presented to show that the antiesterase action of the drug as far as bacterial and crystalline liver esterase are concerned is excellent, but when mitochondria or animal cells are used the action is incomplete. The observations suggest that some barrier exists at the cell wall and at the mitochondria which prevents the chloramphenicol from reacting with the esterase within the animal cell.

There is remarkable agreement between the effects of various concentrations of chloramphenicol on the growth and esterase activity of *Escherichia coli* cells. At least four distinct responses have been observed. At extremely low concentrations the drug produces no significant change in either growth or esterase activity. With higher concentrations a slight inhibitory effect is observed. This in turn is followed by a marked activation of both processes. In the fourth concentration range, which is the therapeutic range, there is a marked inhibition of both growth and esterase activity. This inhibitory action of chloramphenicol on esterase activity may therefore be a clue to the bacteriostatic action of this antibiotic.

PETERS, J. T. (1946.) **The first discoverers of penicillin and of its application in therapy.**—*Act med. scand.* **126.** 60-64. [In English; author's summary slightly modified.] **2091**

Gosio, an Italian, discovered the antibiotic substance present in certain *Penicillium*-species in 1896. Rediscoveries were made by Lieske (Germany) in 1921, by Gratia and Dath (Belgium) in 1924 and by Fleming (England) in 1929.

Gosio isolated the antibiotic substance by making crystals of this substance in 1896. The isolation was repeated by Gratia in 1927 and by Florey and co-workers (England) in 1940.

Gratia and Jaumain (Belgium) were the first discoverers of the therapeutic value of the antibiotic penicillium-extract in 1927. A rediscovery was published by Florey and co-workers in 1940.

DOLL, E. R., & WALLACE, M. E. (1948.)

The blood level response of horses to administration of penicillin in oil and wax.—*J. Amer. vet. med. Ass.* **113**, 240-244. **2092**

For treatment of organisms highly sensitive to penicillin an effective level of the drug in the serum of horses was maintained by injecting 500 units, in peanut oil with beeswax, per lb. body weight at eight hourly intervals. A more generally useful dosage was 1,000 units per lb. injected at 12 hourly intervals. For convenience, a 24 hourly dosage could be used if 4,000 units per lb. were injected.—R. MARSHALL.

MORSE, E. V. (1949.) **The response of cattle to penicillin preparations following intramuscular injection.**—*Amer. J. vet. Res.* **10**, 314-317. [Author's summary slightly modified.] **2093**

Crystalline penicillin G in aqueous solution gave high blood and urine levels for short periods. A dosage of 300,000 I.U. was detectable for three hours in the blood and for seven hours in the urine. One million I.U. gave a blood level of greater than 0.0156 I.U. for a five-hour period. At the end of seven hours, penicillin was still present in traces in the blood and at a 10 I.U. concentration in the urine. The need of repeated administration greatly limits the use of such a product.

One million I.U. of penicillin in oil and beeswax were injected and exhibited a blood level of at least 0.0156 I.U. for 20 hours and a minimum urine level of 10 I.U. for 36 hours. A dose of 1.5 million I.U. gave essentially the same levels for 22 hours, and traces of the drug remained for 48 hours in both blood and urine. The slow absorption of the beeswax is a disadvantage. At the dose levels employed, this product is probably effective for about 24 hours.

Procaine penicillin G in oil gave blood levels of at least 0.0156 I.U. for 26-28 hours, when a dose of 1 million I.U. was used. Traces of penicillin were observed in the blood at the end of 56 hours. A minimum urine level of 10 I.U. was noted for 37-56 hours. A 300,000 I.U. dose produced detectable amounts of the drug in the blood and a 10 I.U. level in the urine for ten hours.

One million I.U., repeated every 48 hours, did not produce the high penicillin blood levels that had been anticipated. Three million I.U., when administered twice with an interval of 72 hours between injections, resulted in a 0.0312 I.U. level for a period of 96 hours after the second injection. Trace amounts were observed at the end of 120 hours.

This product produced no obvious irritation when 10 ml. amounts were injected at one site in the large caudal thigh muscles. It was found that better blood and urine levels were maintained when the entire dose was deposited at one site than when it was divided and two sites of injection used.

This product may be effective for 96-120 hours. High blood levels may be expected at the 3 million-dose level for 72-96 hours.

Blood and urine levels attained after the injection of the respective products, using various dosages, are given in the text or shown in tables.

DUFRENOY, J., & PRATT, R. (1948.) **Cytochemical mechanisms of penicillin action. V. Comparative effects of ribonuclease, cobra venom, and penicillin on susceptible bacteria.**—*J. Bact.* **55**, 525-530. [Author's summary copied verbatim. For part IV., see V.B. 19-170.] **2094**

Agar plates seeded with *Staphylococcus aureus*, *Bacillus subtilis*, or *Proteus vulgaris* were incubated to permit the organisms to reach the logarithmic phase of growth. During this primary incubation period of two hours in the case of *B. subtilis* and *P. vulgaris*, or three hours in the case of *S. aureus*, the organisms developed high dehydrogenase activity. Then aqueous solutions of penicillin, of ribonuclease, of cobra venom, or of mixtures of penicillin with ribonuclease or cobra venom, were placed in "penicylinders" on the plates and were permitted to

diffuse through the agar for two to three hours during a second period of incubation.

At the end of this time, inhibition zones could be clearly revealed by flooding the plates with appropriate reagents, although no such zones were evident on untreated plates. When Pappenheim's stain, which may be used to discriminate between ribo- and desoxyribonucleic acid derivatives, was applied to the plates, the inhibition zones were seen to be areas in which the organisms had been stripped of their basophilic (ribonucleic acid) constituents, while each zone was surrounded by a ring in which the organisms exhibited marked basophilia.

Application of solutions of redox indicators such as triphenyltetrazolium chloride, which may be used as sensitive tests for dehydrogenase activity, revealed very low, if any, dehydrogenase activity within the zones of inhibition, but each zone was surrounded by a ring of intense reducing activity, which corresponded exactly with the intensely basophilic areas revealed by Pappenheimer's stain. The results were the same whether the diffusing compound on the test plates was penicillin, ribonuclease, or cobra venom. The possible significance of these observations in elucidating the cytochemical mechanism of penicillin action is discussed.

SCHOENBACH, E. B., & GREENSPAN, E. M. (1948.) **The pharmacology, mode of action and therapeutic potentialities of stilbamidine, pentamidine, propamidine and other aromatic diamidines—a review.**—*Medicine*. 27. 327-77. [Abst. from abst. in *Trop. Dis. Bull.* 46. 916. (1949.), Signed E. M. LOURIE.] 2095

This is a detailed and comprehensive survey of the development and present status of the diamidines as therapeutic agents. Those who are not familiar with the progress of research on the diamidines in fields other than that of tropical medicine may be interested to know that there have been several surprising and significant developments in these other fields. Propamidine might have become very widely used as a wound disinfectant, if not for the discovery of sulphonamides and penicillin. More striking is the fact that diamidines have some degree of tumour-inhibiting activity. There is evidence that they

combine with and inactivate specific nucleic acids or nucleoproteins, thus preventing the growth of certain tumour cells as studied in laboratory animals and in tissue cultures. This property apparently also underlies the fact that stilbamidine has a remarkably ameliorative, though not a curative, effect on multiple myelomatosis in man. Of more direct interest to tropical workers is the finding that propamidine exercises an inhibitory effect against a limited range of fungi *in vitro*. The treatment of fungus diseases by diamidines might accordingly be worth investigating.

[The authors state that the early work of LOURIE and YORKE established the aromatic diamidines as potentially active agents against infections with African trypanosomes such as *T. rhodesiense* and *T. gambiense*. It might here be mentioned, though, that all the published work up to the present on field trials, as distinct from trials in laboratory animals, with the aromatic diamidines against the trypanosomes of man have been carried out against *T. gambiense* infections. It is a curious gap in the study of these compounds that no report has yet appeared on their action against naturally occurring *T. rhodesiense* infections.]

SMITH, W., & HUMPHREY, J. H. (1949.) **The effect of sodium salicylate upon hypersensitivity reactions.**—*Brit. J. exp. Path.* 30. 560-571. [Author's summary copied *verbatim*.] 2096

Sodium salicylate in blood concentrations of the order of 50 mg. per 100 ml. confers no appreciable protection against acute anaphylactic shock in guinea-pigs. With the same technique of shock production the anti-histamine drug, Antistin, was found to protect completely against the immediate fatal effects.

In passive Arthus reactions in both guinea-pigs and rabbits, sodium salicylate exerts a protective action whilst the anti-histamine drugs are relatively impotent. The same is true to an even greater extent in the case of the Schwartzman phenomenon.

This protective effect of sodium salicylate is not a direct anti-histamine effect but appears to be due to some action on the local blood capillaries. The increased capillary permeability which normally

occurs in such hypersensitivity reactions is thus prevented.

The implications of these results in respect of rheumatic fever are briefly discussed.

CRONKITE, E. P., TULLIS, J. L., TESSMER, C., & ULLRICH, F. W. (1950.) **Failure of folic acid to influence lethal radiation illness in swine.**—*Proc. Soc. exp. Biol.*, N.Y. **73**, 496-497. [Author's summary and conclusions copied *verbatim*.] **2097**

Eight swine were exposed to 400 r total body radiation. Four were treated with intramuscular injections of 45 mg. of folic acid per day. The clinical and hematological courses were observed and postmortem examinations were performed. No differences were observed in the responses of the treated and untreated swine.

MARTIN, G. J., & SWAYNE, V. (1949.) **Effectiveness of vitamin P compounds in counteracting anticoagulant action of dicoumarol.**—*Science*, **109**, 201-202. **2098**

The effect of dicoumarol in producing hypoprothrombinæmia in rats was counteracted by catechin and rutin but not by hesperidin. Ascorbic acid also counteracted the effect of dicoumarol and in combination with catechin the effects were additive.

—R. MARSHALL.

GRAYSON, J., & SWAN, H. J. C. (1950.) **Action of adrenaline, noradrenaline, and dihydroergocornine on the colonic circulation.**—*Lancet*, **258**, 488-490. [Author's summary copied *verbatim*.] **2099**

A simple method is described whereby the changes in temperature of the human colon exposed at colostomy can be used as a qualitative index of blood-flow change in the colon. By this method it is shown that adrenaline and noradrenaline cause a vasoconstriction. The dihydrogenated alkaloids of ergot cause a reflex vasoconstriction, but their direct action on the vessels is dilatation.

BAKER, B. L., INGLE, D. J., & LI, C. H. (1950.) **Increase in glyceride content of brown fat by treatment with adrenocorticotropin.**—*Proc. Soc. exp. Biol.*, N.Y. **73**, 337-339. [Author's summary copied *verbatim*.] **2100**

Treatment of intact or castrated rats with ACTH caused an increase in the glyceride content of brown adipose tissue. Treatment of hypophysectomized rats with 3 times the dose used above failed to maintain the fat content of the interscapular gland at a normal level.

MOLOMUT, N., SPAIN, D. M., & HABER, A. (1950.) **The effect of cortisone on the spleen in mice.**—*Proc. Soc. exp. Biol.*, N.Y. **73**, 416. [Author's summary copied *verbatim*.] **2101**

Cortisone caused a significant reduction in the spleen size of mice. The average spleen size of the cortisone-treated mice was 21% of the controls. As little as 4 mg. of cortisone during a 2 day period produced this effect. Continued cortisone treatment did not increase the original depletion, indicating that the effect is rapid and maximal. Histologically there was a reduction in the size of the Malpighian bodies and in the number of cellular elements in the pulp in the cortisone-treated group.

STAFFORD, R. O., RUBINSTEIN, I. N., & MEYER, R. K. (1949.) **Effect of testosterone propionate on phosphatases in the seminal vesicle and prostate of the rat.**—*Proc. Soc. exp. Biol.*, N.Y. **71**, 353-357. **2102**

The acid and alkaline phosphatase content of the seminal vesicles and prostate glands of rats decreased after castration and could be restored by androgen therapy. The seminal vesicle was found to be more sensitive than the prostate to deprivation of androgens by castration. Although androgen therapy caused hypertrophy of the glands no increase in concentration of acid and alkaline phosphatase beyond the normal limits could be demonstrated.—E. G. WHITE.

LONGLEY, E. O. (1949.) **Electric anaesthesia and electro-narcosis.**—*J. Mental Sci.* **115**, pp. 51-80. **2103**

This is a critical review of electric anaesthesia, of the use of electricity in stunning animals in slaughter houses and of electricity as used for euthanasia of small animals.

The literature of local, spinal and general electrical anaesthesia in man is

dealt with in some detail, the methods used by various workers, the effects in the cerebral circulation, physiological effects on the nervous system, influence of the form of current, possible dangers, and electro-convulsant therapy being considered under separate headings. Of very direct veterinary interest is the section dealing with electrical stunning of animals prior to slaughter and that dealing with electrocution of dogs and cats. Three important conclusions arrived at by L. are: (a) electricity can be a potent anaesthetic agent, (b) the conditions for its effective use are imperfectly understood, (c) when the current fails to attain the strength required for anaesthesia a general paralysis of the motor system precedes the effect on the sensory side; as a result, objective phenomena may resemble those of true anaesthesia while in reality there is no, or only imperfect, suspension of sensation.

The technical difficulties of a study of these phenomena in animals are obviously very great and at present experiments on the subjective state in man are the most valuable.—M.C.

TITCHEN, D. A., STEEL, J. D., & HAMILTON, F. J. (1949.) **Clinical observations in thiobarbiturate anaesthesia in sheep.**—*Aust. vet. J.* **25.** 257-261. **2104**

Two thiobarbiturates, sodium kemithal and sodium pentothal were used as intravenous anaesthetics in 61 sheep subjected to experimental surgical procedures.

Both anaesthetic agents are satisfactory for the sheep. Induction is smooth, rapid and unaccompanied by excitement. Anaesthesia can be controlled satisfactorily and recovery is fairly rapid and very quiet. Kemithal was regarded as being slightly more satisfactory than pentothal because its action was shorter and there was less respiratory depression.

A guide to dosage is presented in table form. Average induction doses of pentothal and kemithal for sheep weighing 20-30 kg. were 0.56 g. and 1.3 g. respectively, and average maintenance doses were 0.2 g. and 0.87 g. Metrazol and carbon dioxide were effective antidotes, but nikethamide was unsatisfactory.

—J. D. STEEL.

See also absts. 1867 (mastitis); 1883 (swine erysipelas and penicillin); 1886 (calf pneumonia); 1887 (fowl cholera); 1894 and 1895 (pullorum disease); 1919 (trypanosomiasis); 1920 (antricyde); 1928 (anaplasmosis); 1990, 1992-1994, 1996-2000 (insecticides); 2016 (caricide); 2018-2019 (filariasis); 2048 (vitamin B₁ in bracken staggers); 2064 (piglet myxoedema); 2067 (atebrin, tryptaflavine, rivanol); 2074 (molluscicides); 2157 and 2158 (books, medicine); 2160 (vet. encyclopaedia); 2161 (book, penicillin); 2162 (book, chemotherapy).

PHYSIOLOGY, ANATOMY AND BIOCHEMISTRY.

BUGARD & AUDOUIN. (1948.) Essai de monographie des ultrasons. [**Ultrasonics.**]—*Rev. Med. Nav. (Métropole et Outre-Mer).* Paris. **3.** 365-393. Abst. from abst. in *Bull. Hyg., Lond.* **24.** 596-597. (1949). **2105**

This study describes briefly the nature of ultrasonic waves, their physical, chemical and biological action, and mentions the work of W. KROGER describing "supersonic sickness" characterized by transitory symptoms of deafness, lassitude, unsteadiness of gait, and nausea. It affects those who work near the exhaust pipes of jet engines which produce a cone of ultrasonic waves of such power and low frequency that they are not immediately absorbed in the air; pilots, outside the cone, are not affected. The pressure of radiations which are inaudible, is capable of causing injury to the organs of hearing

and equilibration, suitable helmets and ear-plugs being necessary for protection.

TRAUTMANN, A., & HILL, H. (1949.). Zur motorischen Funktion des Pansens. [**Movements of the rumen.**]—*Dtsch. tierärztl. Wschr.* **56.** 87-91. **2106**

Curves obtained on the thermoelectric measurement of the rumen temperature of goats showed irregular variations which could be related to the movements of the rumen. The alterations in temperature were due to the positional changes of the food mass resulting from the ruminal contractions and although they give no indication as to the type of contraction, a clear picture of the frequency and intensity of the ruminal movements is obtained. Hunger reduces the number and strength of the ruminal movements, whereas on feeding there is marked ruminal activity.

—J. A. NICHOLSON.

DOUGHERTY, R. W., & CRUMB, D. (1949.)
**A new method for the graphic recording
 of rumen motility in the intact animal.**
—Cornell Vet. 39. 3-10. 2107

The authors after briefly surveying previous methods of recording rumen contractions described a device consisting of a plunger held against the left flank of a cow, by a webbing harness, and activating a spring-loaded, free-running, airtight piston. The piston is used either (a) to transmit a volume change *via* rubber tubing to a distant recording tambour, or (b) to operate a rheostat which is in series with a recording galvanometer.

When checked against conventional recordings in a rumen fistula cow the piston recorder gave excellent results. Another method of recording the movements is described in detail but was discarded. It involved the use of a crystal microphone held against the flank. This method picked up extraneous movements and was too expensive.—R. J. FITZPATRICK.

HEARON, J. Z., BURK, D., & SCHADE, A. L. (1949.) **Physicochemical studies of reversible and irreversible complexes of cobalt, histidine, and molecular oxygen.**
—J. Nat. Cancer Inst. 9. 337-377. 2108

A short discussion on the diverse physiological effects produced by cobalt is given. As it is known that Co^{++} inhibits tissue respiration, which can be reversed partially at least by histidine, a detailed study was undertaken of the mechanism of this reaction. It was found that Co^{++} combined with two molecules of histidine to give a chelate compound with the concurrent liberation of two hydrogen ions. Two molecules of this compound combined with molecular oxygen to form a reversible complex. The mechanism of this reaction was compared with the oxygenation of hæmoglobin. The histidine-cobalt complex also formed an irreversible compound with oxygen. Reactions between other metals and amino acids were also studied.—E. EDEN.

DUCKWORTH, J. (1949. **The three-quarter-bred Holstein-zebu heifer. Part III. The age of puberty.**—*Emp. J. exp. Agric.* 17. 23-27. 2109

Peasant owned Holstein-zebu cattle in Trinidad were noted to breed at an age

considerably more advanced than is usual in temperate-zone cattle. This might be a consequence of the zebu ancestry or a result of malnutrition. Animals were observed under experimental conditions to determine the earliest age at which satisfactory breeding could be achieved. Several heifers showed signs of heat before they were 17 months of age, but conception did not usually follow. The average age of puberty for three-quarter-bred Holstein-zebu heifers was 23 months as compared with the average age of nine months for *Bos taurus* breeds.

A seasonal breeding cycle is not indicated.—S. BRIAN KENDALL.

GRIGG, G. W., & HODGE, A. J. (1949.) **Electron microscopic studies of spermatozoa. I. The morphology of the spermatozoon of the common domestic fowl (*Gallus domesticus*).**—*Aust. J. sci. Res. Ser. B.* 2. 271-286. [Author's summary copied *verbatim*.] 2110

The morphology of the fowl spermatozoon, as revealed by use of the electron microscope and such techniques as partial enzymic digestion and disruption with distilled water, is described in detail, and compared with that observable by light microscopy.

The sperm head carries at its anterior extremity a spindle-shaped body, the apical spine, which normally is closely covered by a conical membranous cap. The apical cap, which has been overlooked by previous workers, may be detached by dilution of the semen with distilled water. It seems likely that these structures are intimately concerned in the penetration of the vitelline membrane during fertilization.

The axial filaent, which contains nine L fibrils arising from the anterior distal centriole and two M fibrils, passes through the mid-piece and continues the full length of the tail, approaching 100 micron in length. It is surrounded in the mid-piece by a number of granules, presumably of mitochondrial origin, which are arranged to give an appearance of bilaterally symmetrical segmentation. The mid-piece is externally surrounded by a delicate membrane easily disrupted in distilled water. There is no evidence for the presence of a spireme or other helically-wound structure in the mid-piece.

In the tail, the axial filament is en-

cased in an amorphous sheath, which decreases in thickness towards the tip of the tail and is easily disrupted by distilled water, allowing the axial filament to fray into eleven fibrils. Two of these fibrils are differentiated from the remaining nine by their dimensions and greater susceptibility to distilled water. It is suggested that the nine L fibrils constitute the locomotor organ of the sperm. It is possible that the two M fibrils function as a rudimentary nervous system.

In direct contrast with the state prevailing in mammalian sperm, there is no helically-wound cord surrounding the axial filament in the tail. This seems to explain why the tails of fowl and of certain other sperm fray easily in distilled water, while those of mammalian sperm do not.

Certain dilution phenomena are explained by the presence of an absorbed layer of colloidal material, which is removable by great dilution or repeated washing of the sperm. The layer greatly modifies the rate of osmosis in hypotonic solutions. There is no trace of a lipid or other capsule external to the cell-wall, as has been postulated to explain similar protective phenomena occurring with other sperm.

SINGER, K., & ROTTER, R. (1949.) **Studies on thrombocytopen. I. A reliable test for this principle in organ homogenates and in urine.**—*J. Lab. clin. Med.* **34**. 1336-1351. [Abst. from author's summary.] **2111**

Thrombocytopen is the name which has been given to a principle, present in the spleen which, when injected into laboratory animals, is said to decrease their platelet count. This principle is believed to play an important role in the pathogenesis of thrombocytopenic purpura. So far nine out of 19 investigators have confirmed the existence of this thrombocytopenic agent.

Assuming that thrombocytopen is manufactured predominantly by the spleen, it seems very likely that the liver may be involved in the inactivation of this principle. Consequently, a more reliable test for thrombocytopen may become available by injection of organ suspensions into animals with liver cell damage.

When organ homogenates were injected into rats with a high degree of

cell damage produced by carbon tetrachloride, a considerable drop of the platelet count was consistently produced. The same organ suspensions did not reduce the platelet count of normal animals.

The platelet-reducing agent found was in normal organs (lung, heart, kidney, brain) obtained from dogs, cattle, or rabbits.

When urine specimens of normal human beings or from patients with thrombocytopenic purpura were injected into rats with liver cell damage, a significant reduction of the platelet level also occurred. The platelet-reducing agent could be extracted with ether.

These results may indicate that physiologically thrombocytopen is rendered innocuous in the liver and then excreted in the urine. Since it can be recovered from the ether extract, this factor is probably lipid in nature. Thus the metabolic behaviour of the thrombocytopenic agent resembles the well-known pattern of steroid compounds.

There is at present no evidence available which would support the hypothesis that thrombocytopen is definitely involved in the pathogenesis of thrombocytopenic purpura.

NEUMAN, R. E., & TYTELL, A. A. (1950.) **Action of proteolytic enzymes on collagen.**—*Proc. Soc. exp. Biol., N.Y.* **73**. 409-412. [Author's summary copied verbatim.] **2112**

The use of hide powder as a substrate in the demonstration of collagenase activity is not valid. Collagens from several sources, prepared by methods designed not to alter properties, are resistant to the action of trypsin, chymotrypsin, and papain. The collagens are readily attacked (solubilized) by the proteolytic enzyme(s) of *Cl. histolyticum* and by pepsin. The proteolytic enzyme(s) of *Cl. perfringens* filtrates are 10-20-fold weaker than those of *Cl. histolyticum* filtrates in the degradation of collagen. The reported increased solubilization of collagens in water at the shrinkage temperature (68-70°C.) after incubation with enzymes can be attributed to residual enzyme. Denaturation of collagen by heat

and urea produces a general susceptibility to common proteolytic enzymes.

BLOCK, R. J., & STEKOL, J. A. (1950.) **Synthesis of sulfur amino acids from inorganic sulfate by ruminants.**—*Proc. Soc. exp. Biol., N.Y.* 73. 391-394. [Author's summary copied *verbatim*.] 2113

Radioactive sodium sulfate was fed to a cow, milk was collected for several days, and the proteins were isolated. The proteins showed appreciable radioactivity. From the hydrolysate of the radioactive proteins cystine and methionine were separated on chromatograms, and eluted. Both cystine and methionine contained radioactive sulfur in appreciable amounts.

NASR, H., & BAKER, F. (1949.) **Microbial synthesis of iodophile polysaccharide by a *Clostridium* from the cæcum of the pig.** [Correspondence.]—*Nature, Lond.* 164. 745. 2114

Pure cultures were obtained of an iodophile strain of *Cl. butyricum* which is primarily responsible for starch digestion in the cæcum of the pig. With washed preparations of old cultures there was an iodine reaction, but not with young cultures.

Preparations of young cultures were incubated at 37°C. in the presence of glucose, glucose-1-phosphate, and sucrose. Older cultures were incubated with these sugars and also with fructose and raffinose.

With young cultures a strong macroscopic iodine reaction was obtained with glucose-1-phosphate in 1-3 days. On microscopic examination the bacteria were found to be deeply stained. No such reaction was obtained with glucose or sucrose indicating that a phosphorylating mechanism is probably involved in the synthesis of iodophile material. With older cultures there was retention of the existing iodine reaction in the controls and glucose-1-phosphate, but not with the other sugars, again indicating the importance of glucose-1-phosphate.

—R. J. FITZPATRICK.

DOUGHERTY, R. W., CONNER, G. H., & MIGAKI, H. (1949.) **Tissue-respiration-stimulating and thromboplastic activity**

of bovine lung extracts.—*Amer. J. vet. Res.* 10. 327-330. [Author's summary copied *verbatim*.] 2115

A method for making a crude lung extract has been described. Two properties of the extract have been studied. Lung extract accelerates blood clotting: 0.0001 c.c. will accelerate the clotting of 2 c.c. of freshly drawn blood. The extract is active in the liquid and desiccated forms. Lung extract lessens the healing time of experimental wounds when applied to the fresh bleeding surfaces. The clot-stimulating properties are apparently due to thromboplastic substance. It will not clot blood from sheep with low prothrombin level (animals having been fed toxic amounts of dicoumarin).

In vitro studies show a marked increase in oxygen uptake of excised rabbit liver when lung extract is added, the principal increase occurring within ninety minutes. Bovine serum had no stimulating effect on excised rabbit liver. The factor or factors which accelerate tissue respiration and the blood clotting are thermolabile, being affected by increased temperatures; are inhibited by changes in pH; are not dialyzable through cellophane membranes; are not affected by low temperatures; and are salted out with half-saturated and saturated solutions of ammonium sulfate.

WIDDOWSON, E. M., & McCANCE, R. A. (1950.) **The effect of rest in bed on plasma volume as indicated by hæmoglobin and hæmatocrit levels.**—*Lancet.* 258. 539-540. [Author's summary copied *verbatim*.] 2116

When normal persons rested in bed for two hours their hæmoglobin, hæmatocrit, and serum-protein levels fell in the expected way; but if the rest was continued for three days the levels rose again to their original height. Similar effects had previously been observed in undernourished persons.

It is suggested that this secondary rise in the concentration of the circulating elements may be the result of inactivity rather than recumbency.

The diuretic effect of 1200 ml. of water was not altered by three days in bed.

WEHMEYER, P. (1950.) Serumproteinkoncentrationen og blodets cellevolumen bestemt hos danske k r. [**Serum protein concentration and cell volume of the blood of Danish cattle.**]—*Maa-nedsskr. Dyrl ger.* 61. 160-166. [English and French summaries; English summary slightly modified.] 2117

The serum protein concentration and the cell volume of the blood were determined for a number of Danish cows.

The mean value and standard deviation of the serum protein concentration is independent of the breed and place of origin of the cows and also of the season in which the blood sample is taken. The standard deviation is greater than that of the plasma proteins in man. The place of origin and season appear to have no influence upon the average volume percentage for a group of cows. Shorthorn cows have a higher average volume percentage than dairy cattle. The standard deviation of the volume percentage deviates significantly from that found for man.

The average serum protein concentration and volume percentage was found in the course of the year to vary from cow to cow. On intake of large amounts of water there is a fall in the serum protein concentration and in the volume percentage; and in one instance the presence of a heart lesion was associated with a rise in the serum protein concentration and volume percentage. Apart from these phenomena there was no parallelism between the serum protein concentration and the volume percentage.

SCHAMBYE, P., & PHILLIPSON, A. T. (1949.) **Volatile fatty acids in portal blood of sheep.** [**Correspondence.**]—*Nature, Lond.* 164. 1094-1095. 2118

Analyses of blood samples taken from the portal vein and caroid artery and analyses of ruminal contents indicated that both volatile acids and glucose are absorbed in considerable quantities in the sheep. The acids concerned are acetic, propionic and butyric which appear to be at least as important as glucose as a product of digestion. It is known that liver glycogen can be formed from propionic acid and the carbon of acetic and butyric

acids has been identified in all positions of the glucose molecule, so that these acids probably play a dominating part in the intermediary metabolism of the liver of ruminants.—J. A. NICHOLSON.

VAN LIERE, E. J., STICKNEY, J. C., & MARSH, D. F. (1949.) **Sex differences in blood pressure of dogs.**—*Science.* 109. 489. 2119

In human beings the mean systolic blood pressure is significantly higher for males than for females. In this study 80 female and 67 male, unselected, adult dogs were an sthetized with sodium barbital and blood pressures were recorded using a mercury manometer directly from a cannula in the carotid artery, the results being given in tabular form. The mean blood pressure was found to be significantly higher in males than in females, the difference being about 9 mm. Hg.

—R. J. FITZPATRICK.

COURRIER, R., ROCHE, J., DELTOUR, G. H., MAROIS, M., MICHEL, R., & MOREL, F. (1949.) Sur l'excr tion mammaire d'iode radioactif apr s administration d'iodures ou d'iodoc s ine marqu s. [**Mammary excretion of radio-active iodine.**]—*C. R. Soc. Biol. Paris.* 143. 599-601. 2120

On the ninth day of lactation a rabbit was injected intraperitoneally with 2.1 mg. iodine in the form of labelled iodo-casein, a second rabbit was injected with 2 mg. iodine in the form of labelled potassium iodide. Samples of milk were tested at intervals up to 170 hours after injection. The quantity of I^{131} appearing in the milk was ten times greater in the case of the second rabbit. The quantity of I^{131} appearing in the milk was only a fraction of the total injected. The rate of uptake of I^{131} from the milk by the thyroid glands of sucklings led to the conclusion that the I^{131} in the milk was in the form of iodide in both cases.—A. T. COWIE.

ROMIJN, C. (1948.) **Respiratory movements of the chicken during the parafoetal period.**—*Physiol. comp. Oecol.* 1. 24-28. [In English, French summary: English summary copied *verbatim*.] 2121

The respiratory movements of the chicken during the last day of incubation (parafoetal period) have been recorded

optically. The changes in respiratory activity before and after the shell perforation have been described and the influence of CO_2 on it discussed.

MACKLIN, C. C. (1950.) **Mouse epicytes and their intramural processes.**—*Canad. J. Res. Sect. D.* **28.** 5-15. 2122

The pulmonary alveolar epicyte has been recognized for many years under various designations, as septal cell, niche cell, little granular cell, and residual alveolar epithelial cell. They are not conspicuous in ordinary sections and require special staining technique. They have been credited with phagocytic potency, but metabolic, endocrine and exocrine roles have also been suggested for them. In thin paraffin sections of mouse lungs fixed by bronchial filling and stained intensely with iron hæmatoxylin, numerous and well-marked epicytes of varying size, form, internal features and density, were demonstrated, details of which are given.

—R. GWATKIN.

BRODY, S., WORSTELL, D. M., RAGSDALE, A. C., & KIBLER, H. H. (1948.) **Growth and development with special reference to domestic animals. LXIII. Heat production and cardiorespiratory activities during gestation and lactation in Jersey cattle.**—*Res. Bull. Mo agric. Exp. Sta.* No. 412. pp. 3-22. 2123

Measurements of the resting metabolism of Jersey cattle showed that in the heifer this was 2,000 kilogramme-calories (C.) per sq. metre per day rising to 2,800 C. shortly before calving and to 3,800 C. at the peak of lactation. The pulmonary ventilation, tidal air, pulse rate and respiration rate showed corresponding increases. These findings are in contrast to the earlier statements that lactation does not increase heat production. The discrepancy is due to the fact that the earlier conclusions were based on studies of heat production under basal conditions in which lactation is greatly depressed and the heat increment of feeding is eliminated.

—J. A. NICHOLSON.

MARKEE, J. E., & SAWYER, C. H. (1949.) **Evidence that copper acetate induces ovulation in the rabbit by direct stimu-**

lation of the adenohipophysis.—*Proc. Soc. exp. Biol., N.Y.* **72.** 174-175. 2124

It is known that copper salts induce ovulation in oestrous rabbits, but the mechanism of this reaction is obscure. It is unlikely that it is a result of nerve-stimulation since, when the copulation stimulus is blocked by dibenamine and atropine, copper acetate administration still leads to ovulation. It was found, however, that the intrahypophyseal injection into oestrous rabbit of 0.15 ml. of 0.1% copper acetate solution led to ovulation in six of eight rabbits, which indicates that at least part of the copper effect is due to direct stimulation of adenohipophyseal cells.—J. A. NICHOLSON.

SYKES, J. F., & WRENN, T. R. (1950.) **Hormonal development of the mammary gland of dairy heifers.**—*J. Dairy Sci.* **33.** 194-204. [Authors' summary copied verbatim.] 2125

Accelerated mammary-gland development has been produced in very young dairy heifers by hormone injections. The type of development and the sequence of developmental stages produced by stilbestrol or stilbestrol and progesterone were distinctly modified by the injection of a crude extract from the pituitary gland. Pituitary hormones accentuated the effects of these steroids on udder development. The udders developed as a result of injections of both steroids and pituitary extract appeared more mature structurally than the udders of heifers injected with steroids only. In the dosages employed in this study, progesterone had no detectable effect on udder development. Evidence is presented to indicate that the injections of the various hormones produced an inhibition of endogenous hormone production. It is suggested that very young dairy heifers may be particularly suitable experimental subjects for determining the effects of the several hormonal factors which appear to participate in udder development of the bovine.

WADA, M. (1950.) **Sudorific action of adrenalin on the human sweat glands and determination of their excitability.** *Science.* **111.** 376-377. 2126

A new technique for studying the

excitability of sweat glands is described. Intradermal injection of highly diluted adrenalin causes local sweating contrary to the accepted view that adrenalin has no sudorific effect on human sweat glands. The sweating produced by adrenalin can be visualized and observations can be made with great precision by painting the skin with a mixture of fine starch powder in castor oil. The spots of sweat from individual sweat glands are visible as black spots of stained starch grains. Certain observations made with this technique are described and illustrated. [This technique may be of value in the investigation of the problem of anhidrosis in "dry-sweating" horses.]—M.C.

LONG, D. A., & MILES, A. A. (1950.) **Opposite actions of thyroid and adrenal hormones in allergic hypersensitivity.**—*Lancet*. 258. 492-495. [Authors' summary copied *verbatim*.] 2127

Past experimental work on the relation of the thyroid and adrenal cortex suggests that their hormones are opposed to each other. Allergic and anaphylactic hypersensitivity are among the physiological and pathological processes

influenced in this way. Thyroxine appears to increase, and the adrenocortical hormones to decrease, hypersensitivity.

Using hypersensitivity to tuberculin in guinea pigs as an example of "bacterial" allergy, we devised a quantitative measure of allergy and have shown that: Moderate thyrotoxicosis of two weeks' duration increases hypersensitivity, whereas either three daily injections of cortisone or one injection of A.C.T.H. diminishes it; moderate doses of propylthiouracil did not affect it. Fourteen days after stopping the thyroxine injections there was a swing of the thyroxine effect in the opposite direction, and the animals were less hypersensitive than the controls. Fourteen days after the treatment with either cortisone or A.C.T.H., there was also a swing in the opposite direction, the animals now being more hypersensitive than the controls. In the thyroxine-treated animals there was adrenocortical hypertrophy, which may account for the "overswing" in allergy after fourteen days without thyroxine. The "overswing" in the A.C.T.H. and cortisone-treated animals may be due to an analogous overcompensation in thyroid activity.

See also absts. 1985 (blood groups); 2037 (passage of food through sheep abomasum); 2038 (metabolism); 2147 (pituitary gland); 2159 (book, biochemistry); 2165 (textbook, histology).

PUBLIC HEALTH, VETERINARY SERVICES AND VETERINARY EDUCATION

LOMBARD, C. (1949.) Sur la composition des pâtés et la nécessité de leur contrôle histologique. [**Histological examination of prepared meats.**]—*Rev. Méd. vét., Lyon et Toulouse*. 100. 30-41. 2128

Under present-day French law, suspect manufactured meat products may be examined by chemical analysis only, such methods giving the total quantity but not the digestible portion of nitrogenous extract, and the use of diseased meat is not detected. A pie, described as "liver pie," combined only a trace of liver, red and white muscle and fat, strands of heart muscle, a notable quantity of blood clots and salivary glands and a very large quantity of connective tissue. Others contained oedematous lung, diseased pericardium, wall of large intestine and skin. The liver, tendons and areolar tissue are

much altered in cooking and may be difficult to recognise, but all muscles, adipose tissue, skin, lungs normal or diseased, kidneys, intestines and clotted blood can be easily recognized.—R. MACGREGOR.

ANON. (1948.) Organisation vétérinaire à Singapour et en Malaisie. [**Veterinary Services in Malaya and Singapore.**]—*Bull. Off. interna. Epiz.* 29. 300-303. 2129

The five distinct and independent veterinary services for Malaya and Singapore include: A veterinary service for the Federation of Malaya at Kuala Lumpur under a director; a veterinary service for the colony of Singapore under a chief veterinarian; two municipal veterinary services for the cities of Penang and Singapore, and the Royal Army Veterinary

Corps, commanded by a senior officer stationed at Singapore. Details are given of the numbers and grades of personnel employed by the different services.

The Island of Singapore does not produce any large numbers of livestock. Apart from the milch cows that supply the town, there are no large herds of cattle and few of pigs. In the two previous years only a few cases of swine fever occurred in Singapore and the outbreak was soon stamped out. There is no veterinary laboratory in the island of Singapore, and vaccines, sera, etc., are sent from Muktesar, India.

The veterinary service for the Federation of Malaya possesses a newly set up research laboratory, six fairly well equipped animal hospitals and 14 less important centres, more than eight quarantine stations for cattle as well as several breeding stations which are being developed. Sera and vaccines are still sent from Muktesar, India. There have been several cases of rabies which has been a constant trouble in the Northern States since the Japanese occupation. Other diseases notified were, piroplasmosis in imported Australian cattle, vaccinia in indigenous cattle, swine fever, and surra. Considerable success has followed the use of the Muktesar vaccine against Newcastle disease in fowls.—R. MACGREGOR.

TAGAND. (1949.) Inauguration officielle de l'Institut Français de la Fièvre Aphteuse 14-15 Mai 1949. [**Official inauguration of the French Institute for Foot and Mouth Disease.**—*Rev. Méd. vét., Lyon et Toulouse*. 100. 436-438. 2130

An account of the celebrations accompanying the official inauguration at Lyons of L'Institut Français de la Fièvre Aphteuse, a State-encouraged commercial institute for the production of F. & M. disease vaccine.—W. M. HENDERSON.

See also absts. 1893 (*Salmonella* infection in rats); 1916 (leptospirosis in rats); 2070 and 2073 (rat poison); 2148 (milk examination).

VAN DER HOEDEN, J. (1949.) La médecine vétérinaire en Israël. [**Veterinary medicine in Israel.**—*Bull. Off. internat. Epiz.* 31. 122-130. 2131

A general account of agricultural developments in Israel in recent years. The introduction of livestock from many countries has led to the introduction of certain diseases. Co-operative Animal Insurance Societies have veterinary surgeons attached to them. A veterinary institute is being built.—G. V. LAUGIER.

MCCALLAM, J. A. (1948.) **Developments affecting the army veterinary service.** [**U.S.A.**].—*J. Amer. vet. med. Ass.* 112. 99-104. 2132

This paper was read at the 84th annual meeting of the American Veterinary Medical Association in August, 1947.

The author referred to the effects of modern developments and new weapons such as atomic bomb explosion and radiation effects on livestock and stored foods for both human and animal consumption and their importance to the veterinary profession in its role as guardian of the livestock industry.

The necessity for planning national mobilization and the responsibility of the veterinary profession to discharge its functions effectively and economically in the conservation of livestock necessitate a study of the requirements of all types of veterinary service, including the practitioners, all government agencies and the schools of veterinary medicine. It was suggested that these could be co-ordinated and directed through a committee of the A.V.M.A., the planning to be done before an emergency should arise.

The staff of regular officers authorized by Congress in 1946 was 50,000 and of these only 200 were to be veterinary officers. The total was still to be reduced by 10%, but this was temporarily withheld.—J.A.G.

LIVESTOCK HYGIENE

STRAHAN, J. L. (1945.) **A method for designing and ventilation for animal shelter buildings.**—*Agric. Engng.* 26. 407-412. [Abst. in *Dairy Sci. Abstr.* 10.

103. (1948.) copied *verbatim*. Signed: W.G.S.] 2133

Armsby's data indicate that large dairy cows produce an average of 3,500 B.Th.U.

per hr., small cows 2,900 B.Th.U. per hr. At 40, 50 and 60 F. 13, 14 and 19 per cent. of the total heat produced is latent, the rest is sensible heat and available for warming the cowhouse. At the same temperatures large cows produce 2,900, 3,200 and 4,400 grains of moisture per hr., small cows 2,400, 2,700 and 3,700 grains per hr. The necessary data for design of a cowhouse are therefore available if a minimum tolerable indoor temperature and a maximum allowable relative humidity are assumed. Insulation must then be calculated to maintain indoor temperature in the coldest weather. In the finished building ventilation is the one controllable factor; its minimum capacity must be just sufficient to give the necessary volume of air change in cold weather and its maxi-

See also absts. 2076 (grazing); 2167 (book, silage); 2168 (book, pastures).

mum capacity must be sufficient to carry away the surplus heat in warm weather. The values suggested are 1,000 and 4,000 cu. ft. per cow per hr.

STRAHAN, J. L. (1946.) **Heat and ventilation in the design of dairy stables.**—*Heat and Ventilation*. 43. 1-7. [Abst. in *Dairy Sci. Abstr.* 10. 103. (1948.) Copied verbatim. Signed W.G.S.] 2134

The argument [see preceding abstract] is developed somewhat farther. It is pointed out that it will be uneconomic to instal a ventilation system capable of controlling indoor temperature when outdoor temperature is much above freezing and that opening of doors and windows will have to be resorted to under these conditions.

REPRODUCTION AND REPRODUCTIVE DISORDERS

KELLEY, R. B. (1946.) **Studies on the breeding performance of ewes.**—*Bull. Coun. sci. industr. Res. Aust.* No. 205. pp. 28. 2135

Since 1935 a series of studies have been made of relative fertility of ewes, particularly Merinos. Concurrent work on genetical problems involved close observations of breeding groups. Analysis of the observations disclosed evidence with respect to associations of age with occurrences of oestrus and with sexual activity.

Ewes selected as weaners and observed from nine months of age had the seasonal periodicity of oestrus observed by KELLEY and SHAW (1943) but there was not maximal occurrence of oestrus in the breeding season until after 21 months of age. Among ewes not less than nine or ten years, and possibly 11 years of age, there was a marked rise in the number not in oestrus during the breeding season which had been established by eight years of observation.

Observations on a group of ewes at the Field Station revealed an increase in the level of fertility from between 15 and 18 months and two years to between three and four years of age. This increase occurred in three stages, the first being characterised by low occurrences of oestrus, the second by higher occurrences of

oestrus but a low conception rate, and the third by relatively high levels of both oestrus and conception.

In the progeny of these ewes the same trend and transition were observed, sexual maturity and highest levels of fertility occurring at, and subsequent to, approximately 3.5 years of age. The levels of fertility of the progeny were lower than those of the dams which had been purchased and reared elsewhere.

It was possible that the disclosed levels of fertility and transition might have been controlled by local environmental conditions. Comparisons were made with data collected from outside sources with respect to Merinos, with observations on other kinds of sheep (Maiden Border Leicester and first cross Merino \times Border Leicester) on the Field Station. Reproductive rates of Merinos were found to be broadly similar throughout and to be lower than those of the other breeds. Sexual maturity was more delayed in the former, leading to a slower increase in population.

It was possible that higher mortality among lambs, reducing the number of potential Merino dams relative to those born in the cross-bred flocks, was associated with the delayed sexual maturity. Observations revealed that death rate increased among first-born lambs with the age of the

dam, that 53.8% of all lamb mortality occurred at births of first lambs, and that 22.3% of all first-born lambs died. Of all ewes dying at parturition 28.6% did so when giving birth to their first lambs, constituting 15.4% of ewe deaths from all causes.

It is suggested that endocrine sufficiency or insufficiency, particularly that of the anterior pituitary, was fundamental for rates of accession to sexual maturity and for relative fertility.

The slow rate of increase of Merino flocks, associated with the possible delayed sexual maturity, restricted numbers available for culling to produce and maintain an even flock.—C. S. SAPSFORD.

DALLING, T. (1949.) La valeur de l'insémination artificielle dans la prévention des maladies vénériennes [**Artificial insemination in the prevention of venereal disease.**]—*Bull. Off. internat. Epiz.* **32.** 149-153. 2136

Artificial insemination centres have been established in Great Britain under the supervision of the Minister of Agriculture and Fisheries whose duty it is to carry out inspections several times a year. The individual centres are in charge of a veterinarian, but for the most part the actual inseminations are carried out by laymen. Before purchase for use at a Centre, the bulls must be approved by the Minister and undergo thorough examination.

One of the important advantages of artificial insemination, is that the risk of spreading venereal infections is greatly reduced, but it is essential that the bulls be examined periodically, paying particular attention to the genital tract. In addition, every precaution must be taken to ensure that the instruments used for insemination and the operator himself cannot transmit any infection. The chief infections to guard against are TB., contagious abortion, trichomoniasis and vaginitis.—J. A. NICHOLSON.

SOBEK, V., & SOBEK, B. (1949.) Vysledky cinnosti okresní inseminací stanice v Havlickove Brode v souvislosti s bojem proti pohlavním nákazám skotu. [**Artificial insemination and control of bovine**

venereal diseases.]—*Cas. ceskoslovensk. Vet.* **4.** 276-280 [English and Russian summaries.] 2137

A report on the activity of an artificial insemination centre in Eastern Bohemia during 1947-48 is given. The semen was diluted with egg yolk citrate 1 : 2 - 1 : 5 and 0.5 - 0.8 ml. per cow of this chilled, diluted semen was used without a speculum. Of 1,232 cows inseminated during the period under review 1,002 became pregnant. Prior to the setting up of the centre 50% of the cows in the surrounding villages were sterile. Two of the bulls used at the centre were found to be infected with *Trichomonas foetus*. They were treated for five months with Lugol solution, colloid silver and sulphonamides, but the semen remained infective, although no pathological changes in the genital organs were observed. There are several diagrams giving percentages of pregnancies after one or repeated inseminations.—E.G.

BONADONNA, T. (1948.) Orientamenti e metodi moderni per la diluizione del materiale spermatico bovino. [**Principles and modern methods of diluting bovine semen.**]—*Zootec. Vet., Milano.* **3.** 113-122. 2138

After reviewing the literature on the development of spermatozoa - preserving diluents, B. comes to the conclusion that the egg-yolk sodium citrate diluent described by Salisbury (1942) is the best type. Experiments showed that the best concentration of sodium citrate for preserving motility of the spermatozoa was 39.20 g. per 1,000 ml. of twice distilled water. B. describes in detail the method of preparing the diluent and the precautions to be taken to avoid bacterial contamination. His method of collecting egg-yolk is to place the yolk, free from egg-white, on a piece of cardboard with a central hole. The yolk is pierced through this hole, from below, with a Pasteur pipette and the contents are allowed to run down into a graduated cylinder. After the addition of the citrate, the mixture must be reduced to a temperature of 1-5°C. and then added to the spermatozoa which have been gradually reduced to the same temperature. The total time taken

to prepare the diluent in this way is about one and a half hours.—I. W. JENNINGS.

VANDERPLASSCHE, M., & PAREDIS, F. (1949.) Hoe lang behoudt stiersperma zijn bevruchtungskracht binnen het geslachts-apparaat van vrouwelijke runderen. [**The viability of bull semen within the genital tract of cows.**—*Tijdschr. Diergeneesk.* 74. 831 - 838. [English, French and German summaries; English summary slightly modified.] 2139

Earlier work on cattle showed that matings and inseminations at the start of heat give a lower conception rate than when the heat period is well established. Hence it is generally admitted that the maximum viability of bull-semen in the genital tract of cows is of about 30 hours. The fairly constant conception rate obtained by the authors with inseminations throughout heat and the fact that stallion-semen retains its fertilizing capacity for at least 48 hours after insemination, led them to suppose that viability of bull semen was longer than 30 hours.

To determine the maximal viability, they inseminated 45 cows and heifers several hours before the onset of heat. With inseminations from 3 up to 24 h. before oestrus, 11 out of 22 animals became pregnant. That meant a conception rate of 50% in comparison with 62% with inseminations in the normal heat period in otherwise identical conditions. Three cows inseminated 48 hours before heat did not become pregnant.

The authors concluded that bull semen in the uterus or in the oviducts of cows, retains its fertilizing capacity in many cases for at least 55 hours and probably, in rare cases, longer than 75 hours.

KEAST, J. C., & MORLEY, F. H. W. (1949.) **Some observations on artificial insemination of sheep.**—*Aust. vet. J.* 25. 281-287. 2140

The results of inseminating Peppin Merino ewes during 1945 (aged) and 1947 (mixed, including many maiden ewes) are discussed. The inseminating dose was 0.1 ml. (on some occasions 0.2 ml.). Dilutions (details of diluting fluids given) were used only when the semen was insufficient to inseminate all ewes available

on one day and were never greater than 1:4. Dilution of semen appeared to reduce its fertility, but this could not be attributed to the technique used in making the dilutions.

Doses below 5×10^7 spermatozoa were reasonably satisfactory. Spermatozoa doses should be the criterion when diluting semen. Semen available should be so divided as to give a maximum available dose to all ewes in season. Samples of poor consistency often gave satisfactory results. The possibilities for artificial insemination varied considerably because the rams differed individually in the number of spermatozoa ejaculated.

Three types of vaginal mucus were observed in ewes, viz: (1) copious, clear and viscid, apparently characteristic of normal oestrus; (2) thick and creamy, probably characteristic of the termination of oestrus and occurring well after ovulation as only nine of 31 ewes conceived when inseminated in this state; and (3) sparse and sticky, regarded as characteristic of ewes in dioestrus or in early stages of oestrus, as only one of 11 ewes conceived when inseminated in this state.

Deposition of semen into the anterior vagina was less effective than deposition into the cervix. One insemination per heat period produced results as good as those obtained with two inseminations.

Yard teasing, supplementary to paddock teasing with rams marked with red ochre, was discontinued in the 1947 series without apparently affecting the results.

Variation in pH of ejaculated semen appeared to indicate changes in proportion of spermatozoa to accessory secretion rather than any change in fertility. No significant difference in fertility was observed between semen samples, with pH below 6.0 and those with pH ranging from 6.1-6.5, pH being determined after anaerobic incubation for 30 mins. at 85°F.

There was no distinct correlation between observed motility and fertility of the semen. Factors reducing motility were (1) low atmospheric temperatures; (2) poor consistency of semen, and (3) rapid drying of semen on slide. The hanging drop method of Anderson (1944) is recommended for motility examinations.

The authors emphasize the advantages of Gunn's (1936) electrical stimulation method when the rapid collection of large volumes of semen is desired.

The time required to inseminate 50 ewes per day was six man-hours of un-

skilled labour and 2-4 hours of professional time. Undiluted semen from two rams, used immediately after collection, gave 60% and 69% conceptions respectively, whereas diluted semen gave results about 13% below this.—C. S. SAPSFORD.

See also absts. 1864 (streptococcal infection in dogs); 2033 (nutrition and fertility); 2102 (sex hormones); 2155 (report, W. Australia); 2169 and 2170 (books, A.I.).

ZOOTECHNY

BONSMA, J. C. (1949.) **The Afrikaner. Relation between conformation, function and adaptability.**—*Fmg. S. Afr.* 24. 459-464 and 472. 2141

The characteristics which have value in rendering an animal adaptable to its environment and which should be selected by breeders are emphasized, using the Afrikaner breed as example. Important characteristics in adaptability to a tropical climate are the nature of the hair, thickness and looseness of the skin, walking ability and grazing habits. A woolly coat is a serious handicap in a hot climate. The differences between woolly and smooth coats are strikingly demonstrated by felt-ing tests. A felt made from hair of woolly coated Shorthorns required a force of 26 lb. to draw it apart, while a felt made

from hair of smooth coated Shorthorns required only 4 lb. It was not possible to make a felt from the smooth hair of Afrikaner cattle. The thickness of the individual hairs varies greatly. The average hair thickness of woolly coated beef cattle was 40u, that of smooth-coated beef cattle 44u, while that of Afrikaner cattle was 54u.

Skin fold thickness of these three types varied as follows: 0.56 cm., 0.75 cm. and 1.4 cm, respectively. Points of conformation of practical importance are a smooth upper shank and straight foot joints which facilitate walking ability. Short Achilles tendon hampers walking. Crooked tails are associated with open spaced vertebrae and should be selected against in breeding stock.—M.C.

See also absts. 2103 (electrical stunning); 2109 (Holstein-zebu cattle).

TECHNIQUE AND APPARATUS

SAUTTER, V., & LEPINE, P. (1948.) Etude des causes d'erreurs dans les réactions d'héماغglutination. Rôle du cuivre. [Copper as a cause of error in the hæماغglutination test.] — *Ann. Inst. Pasteur.* 74. 261-270. 2142

The use of old instead of freshly distilled water in the preparation of isotonic saline produced irregular results, e.g. a known negative becoming positive, in the hæماغglutination - inhibition test for influenza. This was not caused by differences in pH, for the age of distilled water was found not to affect its pH and a range of pH from 6.3—8.5 did not produce any irregularities. Sterilization in the autoclave effected an improvement when the distillate was 20 days, but not when three and a half months old, and with water autoclaved 20 days after distillation and resterilized at further intervals of 20 days normal results were obtained. Using

sterile distilled water which had been stored in sealed glass phials, normal agglutinability was retained, but not when containers plugged with cotton wool were used. Removal of any dissolved gas from old distilled water under negative pressure led only to a slight increase in agglutinability; on the other hand, aeration of distilled water three and a half months old by compressed air restored agglutinability to normal.

Water distilled in a copper still was redistilled in a glass still and varying amounts of copper sulphate or copper acetate were added to different samples. In concentrations such as would occur in water distilled in a copper still irregularities were produced in the test, i.e., false positives in known negatives. Sterilization in the autoclave had the same effect as sterilization of old distilled water, normal agglutinability was restored.

The authors emphasize the need to use

water that has been redistilled in a glass in the hæmagglutination-inhibition test.

—L. M. MARKSON.

SMOLELIS, A. N., & HARTSELL, S. E. (1949.) **The determination of lysozyme.**—*J. Bact.* 58. 731-736. [Author's summary copied *verbatim*.] 2143

The method of assay for lysozyme described has proved to be sufficiently accurate to recommend its use in testing various materials for lytic activity. It has been successfully applied to the examination of several preparations containing lysozyme (dried egg albumin, fresh hen's egg albumin, and extracts from animal tissue. The method is rapid and thus makes possible the testing of large numbers of materials in a relatively short time.

A method has been described for the preparation of a large number of *Micrococcus lysodeikticus* cells for use in the turbidimetric assay of lysozyme. It is possible to store these cells at icebox temperatures without any appreciable reduction in their sensitivity when used in assaying lysozyme. Consistent titers for lysozyme activity were obtained in replicate tests.

The method has been shown to be adaptable for both high and low concentrations of the enzyme from natural materials, and to give reproducible results in each instance.

THOROLD, P. W. (1949.) **A simplified method for the primary isolation of the dermatophytes.**—*J. S. Afr. vet. med. Ass.* 20. 89. 2144

To eliminate bacterial contaminants T. uses copper sulphate 1:2,000 and corrosive sublimate 1:10,000. These can be added at any stage during the preparation of the media. Growth of pathogenic dermatophytes appears after 48-96 hours, that of fungal contaminants within 24-48 hours.

—W. R. BETT.

MUSKATBLIT, E. (1949.) **Staining of fungi in scales and hairs. Method of staining with polychrome methylene blue.**—*Arch. Dermat. and Syph.* 59. 236-242. [Abst. from abst. in *Bull. Hyg., Lond.* 24. 616. (1949).] 2145

Fragments of infected hair stumps or small pieces of well-teased-out skin scales

are mounted on a wet smear of egg albumin on a slide, and allowed to dry. The preparation is then fixed with Carnoy's fluid for 5 to 10 minutes. After drying, the preparation is stained with a solution of polychrome blue for about five minutes and then washed in water for one to two minutes. The preparation is differentiated with 1% aqueous acetic acid, and mounted in balsam.

The usefulness of this method of staining is amply illustrated in several beautiful photomicrographs of fungi in hairs or skin scales.

McFARLANE, A. S. (1949.) **Electron microscopy of bacteria and viruses.**—*Brit. med. J.* Dec. 3rd. 1247-1250. 2146

This is a general article on electron microscopy. Artefacts resulting from drying, the features of plant and animal viruses and bacteriophage, and the varying opacity of bacteria with age are some of the points discussed. There are a number of photographs. Lipoid inclusions can be demonstrated in the tubercle bacillus by electron microscopy, but there is no evidence of the waxy envelope with which this organism is supposed to be surrounded. Whether nuclear bodies occur in bacteria is still undecided: in some cases the so-called nuclear inclusion probably represents the shrunken body of the organism.

—E. G. WHITE.

RONCATTI, G. (1948.) La citologia dell'ipofisi bovina con un moderno metodo di colorazione. [Cytology of the bovine pituitary gland using a modern method of staining.]—*Nuova Vet.* 24. 114-119. 2147

R. used Ehrlich's hæmatoxylin and fuchsine stains plus a modification of Mallory's stain on paraffin embedded sections. Details are given.

LEVINE, B. S., & BLACK, L. A. (1949.) **Comparative analysis of the standard methods methylene blue stain and advantages of the polychrome and acid-and-water-free stains in the direct microscopic examination of milk.**—*Amer. J. publ. Hlth.* 39. 1110-1119. 2148

Direct microscopic counts were made on 75 milk specimens collected from a

milk depot. Films were made on collection and the counts were made after the films had been stained in sets with carbolized methylene blue on the day of collection; with polychrome methylene blue seven days after collection or the acid-and-water-free stain developed by the authors 14 days after. The specified method of staining with carbolized methylene blue states "if overstained, partially decolourise in alcohol." It was found that counts varied greatly after partially destaining slides in alcohol and the differences were of significance from a general statistical viewpoint. Two batches of polychrome methylene blue stain were used. They gave different results, one batch giving counts lower than either of the other stains. Further study is needed in the standardization and method of preparation of this dye.

The acid-and-water-free stain gave the highest number of maximal counts, and 50 slides stained 90 days after the films were made gave similar results to those stained after 14 days. The authors consider that milk films could be prepared in a central laboratory and distributed to other centres for staining and counting.

—J. O. L. KING.

AHERN, J. J., BARCLAY, W. R., & EBERT, R. H. (1949.) **Modifications of the rabbit ear chamber technique.**—*Science*. 110. 665. 2149

A modified chamber is described made entirely of plexiglass except for a mica cover slip. A precision instrument has also been designed to punch the holes in the ear so that a close fit can be achieved. This method is useful for the microscopic study of living vascular tissue over a period of weeks or months.—L. M. MARKSON.

ATKINSON, H. F. (1949.) **Use of Geiger counter for quantitative estimation of phosphorus-32 in histological sections.** [Correspondence.]—*Nature, Lond.* 164. 541. 2150

A description and a diagram are given of an apparatus for determining radio-active phosphorus 32 in sections of human enamel.—E. EDEN.

SPRAGUE, C. F., & BELLAMY, W. D. (1949.) **Micromanometric determination of galactose by differential fermentation**

using a strain of *Streptococcus mastitidis*.—*J. Bact.* 57. 95-100. [Authors' summary copied *verbatim*.] 2151

A method is described for the rapid, accurate microdetermination of galactose in the presence of glucose, fructose, mannose, or lactose. The method is based on the presence of an adaptive enzyme for the fermentation of galactose in a strain of *Streptococcus mastitidis*. As little as 200 micrograms of galactose can be determined accurately. The method can be extended to the quantitative determination of mixtures of glucose, galactose, fructose, and lactose.

JORGENSEN, A. (1949.) Surt natriumpyrofosfat som koagulationshaemmende middel ved udtagning af blod til fremstilling af blodpølser. [Acid sodium pyrophosphate as anticoagulant in withdrawal of blood for the production of blood sausages.]—*Nord. Vet.-Med.* 1. 351-353. 2152

J. discussed various methods of treatment of blood withdrawn during slaughter from pigs and cattle at Danish abattoirs to render it suitable for blood sausage manufacture.

Defibrination involves considerable labour in stirring the blood; there is also risk of its contamination and its nutritional value is reduced. Anticoagulant treatment with a mixture of 20% solutions of acid sodium pyrophosphate and sodium chloride in the proportions of 60% and 40% respectively, using 50 g. of mixed solution per l. of blood, made it unsuitable for this type of sausage manufacture, in that it had lost its binding property, which was dependent on the presence of free calcium ions.

It was found that the minimum amount of sodium pyrophosphate necessary to prevent coagulation without destroying the binding property of the blood was only one quarter of the amount originally used. Since the blood is used fairly quickly, the addition of sodium chloride was unnecessary. J. used 1.5 parts of acid sodium pyrophosphate per thousand parts of blood.

The technique of bleeding is described in detail.—F.E.W.

See also absts. 1873 (Tween 80); 1908 (Filatov technique); 1909 (growing dermatophytes on hairs); 1917 (leptospirosis demonstration in rats); 1923 (trypanosome cultures on moth pupae); 1932 and 1933 (F. & M. disease virus culture); 1963 (feline pneumonitis agent culture on dead chick embryo); 2110 (electron microscopy of spermatozoa); 2166 (book, laboratory methods).

MISCELLANEOUS

MUELLER, L. R. (1948.) Ueber den Schlaf der Tiere. [**The sleep of animals.**—*Naturwiss. Rdsch.* 6. 261-270. [Abst. in *Biol. Abstr.* Sect. F. 23. No. 8. p. 2. (1949), copied *verbatim*. Signed: WERNER SCHNABEL.] 2153

All available material on the sleeping customs of animals is reviewed in a theoretical study on the nature of sleep. Each animal interrupts the 24-hr. daily period by a pause for rest in which psychokinetics, innervation, nourishment, and readiness for flight are widely suppressed. The length of such a pause for rest differs according to the species and the age of the animals. Most of the animals sleep "monophasically," a few (e.g., the rodents) "polyphasically." With some sp. of animals there are distinct types of night- and day-sleepers. Most of the

more highly organized animals prepare for sleeping. By means of electroencephalic studies a sleep-regulation center has been found in cats. It is not improbable that such a center also exists in other mammals.

HALLGREN, W. (1944.) Ett veterinärmedicinskt bidrag till kännedomen om den vetenskapliga fotografins historia i Sverige. Tillika ett bidrag till kännedomen om vommsnittets historia. [**The history of scientific photography in Sweden. Also the history of rumen surgery.**—*Svensk VetTidskr.* 49. 193-204. 2154

A description of a collection of photographs taken at Skara veterinary institute at or about 1860. It contains both personal and animal photographs, which are discussed.—J.E.

REPORTS

AUSTRALIA. (1949.) **Western Australia. Annual report of the Department of Agriculture for the year 1947-48.** [CLARKE, A. L. MCK.] pp. 50. Perth: Govt. Printer. [Items of veterinary interest. pp. 38-40.] 2155

Very good results were obtained with penicillin treatment of MASTITIS. Unfortunately the hygienic control measures advocated by the Department were rarely adopted.

Control of TB. by tuberculin testing, slaughter and compensation, in accordance with Part VI of the Milk Act, has made steady progress. Testing commenced on July 1st, 1947, and was largely confined to the metropolitan area. Summarized results were:—93 herds in metropolitan areas, comprising 5,539 head, gave 40.5% of reactors at the initial test; 92 herds (3,147 head) gave 6.4% reactors on re-test and 12.3% reactors were found among 2,141 head purchased as replacements. Among 33 herds supplying four country towns the percentages of reactors in each centre were much lower, viz 8.5, 10.7, 3.8, and 8.7% respectively.

A scheme for vaccination of heifers against CONTAGIOUS ABORTION in dairying districts was introduced in May, 1946, and 25,742 had been vaccinated to date. There

has been a steadily growing demand for vaccination in the districts concerned and results appear to have been very satisfactory. Several isolated outbreaks of BLACK-LEG were reported in cattle.

At the Animal Health and Nutrition Laboratory a total of 64,408 specimens, received for diagnosis, included blood samples from 76 flocks of poultry in the voluntary PULLORUM DISEASE control scheme: of these 6.8 per cent. gave positive agglutination reactions.

During the year a serious outbreak of LARYNGO-TRACHEITIS in poultry occurred in the metropolitan area. This disease was first diagnosed in Western Australia in February, 1948. Subsequent investigations established that it had been present for a number of years and had affected several localities. Because of its wide distribution protective vaccination offered the only practical means of control, but to prevent further spread a quarantine area was declared, embracing the metropolis and immediately surrounding districts.

MUSCULAR DYSTROPHY was diagnosed in lambs. Dry unfavourable seasonal conditions were responsible for serious sheep losses from PREGNANCY TOXAEMIA, URINARY CALCULI and also from the type of ENTERO-TOXAEMIA associated with ingestion of the

pappus hairs of stinkwort (*Inula graveolens*).

Heavy losses from KIMBERLEY HORSE DISEASE were reported in the Kimberley Division. Although this disease can result from ingestion of "white wood" (*Atalaya hemiglauc*) it is believed that other factors, including the ingestion of other plant species, may be involved. Similar equine diseases occur in Queensland and the Northern Territory and a joint investigation by the Commonwealth and the States concerned is proposed.

The investigation of SHEEP INFERTILITY on SUBTERRANEAN CLOVER PASTURES [see V.B. 17. 322; 18. 87 and 228] was again the major research project. Investigations were concerned particularly with the nature, distribution and physiological effects of the oestrogen-like substance present in green clover, which is responsible for infertility, dystokia and prolapse.

From the economic viewpoint this problem may be solved by changes in farming practice and more extensive growth of cereal crops, increased emphasis on balanced pastures containing adequate non-clover herbage, and the realization that green subterranean clover is potentially dangerous for sheep have been accompanied by reduced incidence.

A form of temporary INFERTILITY IN DAIRY COWS was studied in herds on three selected farms in the South West, particularly with reference to mineral status of cows and pastures. Investigation disclosed a serious PHOSPHORUS DEFICIENCY. Bone-meal supplements temporarily improved levels of blood inorganic P, but subnormal values were still present in June, despite abundant young green pasture, heavily topdressed with superphosphate. The investigation is continuing.

—H. W. BENNETTS.

BOOK REVIEWS

HAUDUROY, P., CHAIN, E., FLOREY, H., JENSEN, K. A., PENSO, G., TREFOUËL, J., & WELLS. (1950.) *Bacilles tuberculeux et paratuberculeux. Bactériologie. Chimie Antibiotiques. Chimiothérapie. [Mycobact. tuberculosis and other mycobacteria.]* pp. 183. Paris: Masson & Cie. Fr. 850. 2156

This symposium presents papers by a group of distinguished workers on various aspects of problems relating to mycobacteria. Prof. Chain gives a brief résumé of information relating to the structure and biological activity of mycobacterial lipoids, polysaccharides and proteins and, in particular, deals with phthioic acid, the two polysaccharides which have so far been characterized, and Seibert's protein fractions A, B, and C. This is followed by a discussion on antibiotics by Prof. Florey. As one would expect, streptomycin and dihydrostreptomycin occupy by far the greater part of this section, but brief references and an extensive bibliography provide information on many of the antibiotics which have been isolated from fungi, actinomyces organisms and bacteria.

Prof. Hauduroy, the editor of this volume, contributes the next paper. It is concerned with the perennial problem of the nature and significance of acid-alcohol

resistance and the question of non-acid forms in infection. Prof. Jensen follows with a discussion of methods of typing human and bovine strains and presents valuable information based on his considerable personal experience of the problem.

The difficult question of the classification of mycobacteria is Dr. Penso's contribution. He deals, in particular, with the saphrophytic types, and presents a considerable amount of unpublished and useful information relating to phages, to resistance to high temperatures and to *p*-aminosalicylic acid inhibition. Dr. Tréfouël of the Pasteur Institute discusses sulphonamides, sulphones, and *p*-amino salicylic acid in relation to experimental work in rabbits, mice, rats, and *g. pigs* and clinical therapy in man. The vole bacillus forms the subject matter of the last chapter, by Dr. Wells, who presents information relating to the cultural and pathological characteristics of the organism and to its efficacy as an immunizing agent.

The book as a whole presents a general picture of information available and, as such, will prove useful to the reader interested in obtaining an outline of the state of knowledge in the fields under review. Bibliographies are provided

at the end of most of the sections, but no uniform system of arrangements has been adopted and the cramming together of all the data with no line separation makes it difficult to find any particular reference.

—J. LOCHIEL MCGIRR.

SHELLEY, H. M. [F.R.F.P.S., M.R.C.P. (Lond.), D.T.M. & H. (Eng.). Diplomate with distinction of the London School of Hygiene and Tropical Medicine]. (1949.) **An epitome of the laboratory diagnosis and treatment of tropical diseases.** pp. 147. London: Staples Press Ltd. New York: Staples Press Inc. 2nd Edit. 10s. 6d. **2157**

This book is intended for the use of busy practitioners of human medicine and gives an outline of simple laboratory methods of diagnosis and notes on treatment of tropical diseases. It bears evidence of hasty preparation and inadequate proof reading which probably account for the many spelling errors. For example, on p. 82 *Brucella suis* is given as *Brucella sins* and a "flask of broth" is given as a "flask or both," while on p. 135 "spirochæta" is given as "spiraochæta" and "*Proteus vulgaris*" as "*Proteous vulgaris*." A compendium of drugs of common use in tropical medicine is given and one is rather surprised to find such items as phenothiazine and streptomycin included while paludrine is omitted.—M.C.

PARKER, F. P. [M.D., Associate Professor of Pathology, University of Virginia School of Medicine, Charlottesville, Va. [Edited by] (1948.) **A textbook of clinical pathology.** pp. xx + 1023. Baltimore: Waverly Press, Inc. 3rd. Edit. 50s. **2158**

The field of veterinary clinical pathology has been poorly developed in comparison with human medicine. There are many widely-recognized, limiting factors, not the least being the paucity of literature dealing specifically with veterinary problems. This third edition of "A Textbook of Clinical Pathology," though dealing entirely with the human aspect, should maintain its position as a first class reference book for research workers, clinicians and students.

The book has been exceptionally well-produced, the emphasis placed on inter-

pretation of laboratory findings providing one of its best features. Eight eminent American authors have each contributed one or more of the 21 chapters. In addition to the editor they are: I. Davidsohn, L. W. Diggs, Emmerich Von Haam, Roy R. Kracke, Ralph McBurney, Henry E. Meleney and V. P. Sydenstricker. In describing each technique, they have selected one reliable example, this economy enabling them to cover a fairly wide range of topics in a most up-to-date and practical manner. The chapters on hæmatology are very comprehensive and include a detailed description of clinical blood chemistry. The methods of assay of vitamins and hormones and the tests of liver function are carefully elaborated. Chapters are devoted to tests of renal function, immunological tests and diagnosis of venereal diseases. The methods of examining sputum, gastric and duodenal contents, urine, seminal fluid, fæces, cerebrospinal fluid, transudates, exudates, skin and mucous membranes are ably described.

The text is completed by an appendix dealing with certain laboratory procedures and an index. Numerous references are given at the ends of the chapters and a high standard of literary presentation is maintained throughout. The publishers are to be congratulated on the good quality of paper, type and binding.—E. F. LEWIS.

CANTAROW, A. [M.D. Professor of Biochemistry], & TRUMPER, M. [Ph.D. Commander, H(S), USNR. Lecturer in Clinical Biochemistry and Basic Science Coordinator, Naval Medical School, National Naval Medical Center, Bethesda, Maryland]. (1949.) **Clinical biochemistry.** pp. xix + 642. Philadelphia & London: W. B. Saunders Co. 4th Edit. 40s. **2159**

This book is mainly written for students and for clinicians to help them to understand the significance and the limitation of laboratory investigations. For this a large amount of diverse information has been collected from various reviews and original articles.

The first three chapters deal with carbohydrate, protein and lipid metabolism. The next eight chapters are concerned with mineral metabolism; the

elements included are: calcium, phosphorus, magnesium, iron, sulphur, iodine, sodium, potassium and chlorine. This is fittingly followed by two chapters on water and acid-base balance. Respiratory exchange and basal metabolism are next discussed. Vitamins have a chapter to themselves.

The second half of the book is concerned more with functional biochemistry. A discussion of diabetes is followed by one on renal function and nephrosis. Next hepatic and digestive functions are dealt with. A special chapter is devoted to the cerebrospinal fluid. Biochemical changes in pregnancy, hormonal assay and endocrine function are also discussed.

The last chapter is a synopsis of the chemical abnormalities found in various diseases. The table at the end giving normal chemical standards is a useful summary of the range of levels of various chemical compounds considered normal in the blood, cerebrospinal fluid and urine. Figures are also given for kidney and liver function tests. There is an excellent index.—E. EDEN.

WIRTH, D. [Edited by]. (1948-49.) *Lexikon der praktischen Therapie und Prophylaxe für Tierärzte. [Encyclopædia of practical therapy and prophylaxis for veterinarians.]* Vol. I. pp. 1-596; Vol. II. pp. 597-1251. Vienna: Urban & Schwarzenberg. Sch. 260 (\$26). 2160

This new dictionary of animal diseases and index of treatment and control is a very successful and useful publication. The diseases are dealt with in three sections which outline the nature and ætiology, curative treatment and prophylaxis respectively; and there are also articles about broad classes of drugs (emetics, etc.) and therapeutic procedures (actual cautery, etc.). All this is arranged alphabetically and at the end there is a posolgy table extending throughout 50 pages, and a subject index. There are over 200 line drawings.

The material is fairly well up to date and it is, of course, firmly linked with German materia medica and technique, which appears slightly out-dated to the English-American world: for instance SO_2 gas treatment for mange is described

in much detail and the highly effective miticides which are so much more easy to apply and are so effective are not referred to satisfactorily. Several Austrian veterinary authorities have collaborated with Professor Wirth in the production of the book.—J.E.

FLEMING, A. [M.B., B.S., F.R.C.P., F.R.C.S., F.R.S.; Professor Emeritus of Bacteriology, University of London; Principal, Wright-Fleming Institute of Microbiology, St. Mary's Hospital Medical School, London.] (1950.) **Penicillin: its practical application.** pp. xii + 491. London: Butterworth & Co. (Publishers) Ltd. 2nd Edit. 30s. 2161

The numerous sections of this 2nd edition have largely been rewritten since the book first appeared in 1946. New sections have been added on the toxic manifestations of penicillin and on its use in acute infectious diseases. Reference is made to the newer antibiotics by a chapter on streptomycin and brief notes on chloromycetin and aureomycin.

The scope of this volume is very wide. It includes authoritative articles on some 28 aspects of the history, manufacture, pharmacology and clinical use of penicillin, each contributed by authors of wide experience in their subject. The book is primarily intended for the medical profession, but two of the sections are on the uses of penicillin in dentistry and in animal diseases respectively. The latter section covers methods of administration and the use of the antibiotic in the treatment of bovine mastitis, bovine pyelonephritis, anthrax, actinomycosis, actinobacillosis and other bacterial infections of cattle, strangles of horses, swine erysipelas and canine leptospirosis.

Although the veterinary applications comprise no more than about 8% of the clinical sections of the book, the fascinating story of the early work on the antibiotic and the subsequent development of full scale production is bound to be of great interest to all.—W. M. HENDERSON.

MACLEOD, C. M. [Edited by]. (1949.) **Evaluation of chemotherapeutic agents.** (Symposium held at the New York Academy of Medicine March 25 and 26,

1948.) pp. xii + 205. New York: Columbia University Press. London: Geoffrey Cumberlege, Oxford University Press. 28s. **2162**

In this symposium the term "chemotherapeutic agents" includes both substances synthesized in the laboratory and antibiotics of microbial origin. It consists of 14 separate papers, the object as stated in the foreword being to provide a forum for exchange of information amongst workers in basic and clinical sciences. Each paper provides a wide review of some particular field of knowledge. The subjects dealt with are (1) Significance of drug concentration in the blood, as applied to chemotherapy by Marshall, E. K.; (2) Blood levels, renal clearance, and chemotherapeutic activity, with particular reference to arsenicals and penicillin by Eagle, H.; (3) The binding of chemotherapeutic agents to proteins and its effect on their distribution and activity by Davis, B. D.; (4) The problem of microbial resistance to chemotherapeutic agents by Alexander, H. E.; (5) Defence mechanisms of the host in relation to chemotherapy of acute bacterial infections by Wood, W. B.; (6) The nature of the lesion and the response to antimicrobial therapy by McDermott, W.; (7) Transcutaneous antibiotic therapy of localized soft tissue infections by Sanders, E. K., and Lockwood, J. S.; (8) Chemoprophylaxis of meningococcal infections and of bacillary dysentery by Cheever, F. S.; (9) An evaluation of chemoprophylaxis of streptococcal infections by Wilson, A. T.; (10) Evaluation of antimalarial drugs by Shannon, J. A.; (11) The chemotherapy of rickettsial diseases by Fox, J. P.; (12) Chemotherapy of viral infections by Horsfall, F. L., and Ginsberg, H. S.; (13) The experimental evaluation of chemotherapeutic agents in cancer, by Stock, C. C., and Rhoads, C. P.; and (14) The clinical evaluation of chemotherapeutic agents in cancer by Karnofsky, D. A., and Burchenal, J. H.

All of these have applications to veterinary science, but possibly those dealing with streptococcal infections, virus diseases and drug resistance are of special interest.—M.C.

BURSTEIN, C. L. [M.D., Chief, Department

of Anesthesiology, Hospital for Special Surgery.] (1949.) **Fundamental considerations in anesthesia.** pp. xi + 151. New York, London: The MacMillan Co. \$4.00. (30s.). **2163**

This volume is essentially a physiological and pharmacological treatise of the anaesthesia of the human subject. There are 12 chapters dealing with the autonomic nervous system, the respiratory pattern during general anaesthesia, respiratory disturbances, laryngeal spasm, circulatory disturbances, parasympathetic reactions, gastro-intestinal autonomic reactions and pulmonary control.—W. M. HENDERSON.

PRINCE, J. H. [F.R.M.S., F.Z.S., F.B.O.A., F.S.M.C. Late Regional Association Lecturer in Comparative Ocular Anatomy and Ocular Evolution.] (1949.) **Visual development. Vol. I.** pp. xii + 418. Edinburgh: E. & S. Livingstone Ltd. 50s. **2164**

A book entirely devoted to visual development may perhaps appear too detailed to be of interest to the busy veterinarian, but once a reader has embarked on this book he will find it of absorbing interest and difficult to lay aside. The approach has been to discuss photo-reception, perception and retinal structure in man and then to give an account of the evolution of vision in invertebrates and vertebrates. A comprehensive section deals with colour vision and the difficulties in deciding whether animals can appreciate shades of colour rather than the mere brightness of an object are fully discussed. The various animal fundi are described in some detail and illustrated by means of excellent coloured plates. In order to encourage amateur experimenters, a chapter is devoted to the preparation and examination of eye specimens.—J. A. NICHOLSON.

HEWER, E. E. [D.Sc. (Lond.). Formerly Reader in Histology in the University of London and Lecturer in Physiology at the Royal Free Hospital School of Medicine.] (1949.) **Textbook of histology for medical students.** pp. viii + 432. London: William Heinemann Medical Books Ltd. 5th Edit. 25s. **2165**

This book has already attained five editions in the twelve years since it first

appeared, which is ample proof of its worth. The text is concise and free from controversial and esoteric detail, much of the space being devoted to photomicrographs and line drawings. The latter are of uniform excellence, the former sometimes very good—as those illustrating the central nervous system. At other times—as in some of the plates illustrating general histology, for example—they lack crispness and clarity.—L. M. MARKSON.

HEPLER, O. E. [Ph.D., M.D. Associate Professor of Pathology, Northwestern University Medical School.] (1949.) **Manual of clinical laboratory methods.** pp. xv + 387. Springfield, Ill.: C. C. Thomas. Oxford: Blackwell Scientific Publications. 4th Edit. 45s. **2166**

"This is not a textbook of clinical pathology. Its sole purpose is to improve the work of laboratory technicians and medical students by furnishing them with explicit, step-by-step direction for the performance of the different tests." This quotation from the foreword summarizes the aims of a work which now, in its fourth edition, appears in book form instead of planograph. The range of material covered is remarkably wide, comprising urine analysis (pp. 1-96); gastric and duodenal contents (97-105); liver function tests (106-123); faeces examinations (124-145); sputum (146-149); cerebrospinal fluid (150-156); body fluids (158-160, dealing with transudates and exudates, synovial fluid and semen); bacteriology (163-203); mycology (204-220); serology (221-243); blood groups (244-254); clinical chemistry (255-329); allergy extracts (332-335); tissue sectioning (336-342); basal metabolism (343-348); electrocardiography (349-354); and, finally, data on solutions used in routine tests (355-360). Quantitative as well as qualitative tests are described including, e.g. the determination of vitamin A and carotene in plasma.

The text has presumably the merit of describing only methods that the author has tried and found to be successful: it is of necessity, in view of its wide scope, highly selective. One can only infer that the author has in each instance selected the method as the most suitable one on the basis of practical experience, and little pur-

pose would be served by attempting to discuss in detail his particular choices. In view of the fact that the text is widely used by technicians, however, it does seem unfortunate that references to the original papers are not included. The enterprising technician (and certainly the medical student wishing to specialise in clinical pathology) will certainly want to look up the "Clark-Collip modification of the Kramer-Tisdall method" for serum calcium, but authors' names only are cited.

Whilst explicit details of the different tests are in fact given, it is doubtful if the student or technician could always attempt to carry them out except under expert guidance. To take an example with which the reviewer is familiar, the cephalin-cholesterol flocculation test for liver damage, precautions would appear to be necessary that can hardly be covered in a succinct description such as that given. Another possible limitation to the immediate use of the book in laboratories other than that of the author is the free and unexplained use of abbreviations, particularly in the section on bacteriological methods. Not everyone will know off-hand what is meant by, e.g. an "S.S. plate."

Some may feel that this work almost "falls between two stools," covering far too much ground for an average course for medical students and yet being far too selective and insufficiently documented for a work of reference. It nevertheless contains a wealth of information, and will save a good deal of trouble to busy workers who have to provide explicit instructions to technical staff. Its value to medical or veterinary students must depend upon the scope of the course and the experience of the teacher.—ALASTAIR N. WORDEN.

ANON. (1949.) **The production and utilization of silage. A review of world literature in abstracts.** pp. 307. Penglais, Aberystwyth: Commonwealth Bureau of Pastures and Field Crops. Bulletin No. 40. 10s. **2167**

The increasing use of silage in the feeding of livestock makes it desirable that the veterinarian should know the sources from which information may be obtained on problems arising out of its preparation,

conservation and utilization. For that purpose this book, which is in the form of abstracts classified under ten headings and completed with three indexes, will be useful. The indexes are: (a) authors, (b) genera of plants used in the making of silage, and (c) animals which are fed on silage. The veterinarian will naturally be particularly interested in the relationship of silage to metabolic and nutritional disturbances in animals such, for example, as ketosis. Abstracts dealing with such subjects are included, but are not easily accessible.—M.C.

WHYTE, R. O., & SISAM, J. W. B. (1949.) **The establishment of vegetation on industrial waste land.** pp. xiii + 78. Penglais, Aberystwyth, Wales: Commonwealth Bureau of Pastures and Field Crops; and Oxford: Commonwealth Forestry Bureau. Joint Publication No. 14. 10s. **2168**

The open cast mining of coal and metallic ores which was extensively used in Great Britain during the 1939-45 war has focussed attention on the problem of rehabilitating such areas.

Knowledge from many parts of the world is surveyed in this volume. The veterinarian will find the sections dealing with establishment of pasture of special interest and details of efforts which have been successful in several parts of England and the U.S.A. are given. There are many excellent photographs.—M.C.

GALLIEN, L., & ROUX, P. (1948.) *L'insémination artificielle chez les animaux domestiques.* [**Artificial insemination of domestic animals.**] pp. 266. Paris: Presses Universitaires de France. **2169**

This eminently readable book covers a wide field in its three parts, of which (the first is devoted to historical and theoretical considerations, the second comprises practical instructions for the artificial insemination of a great variety of animal species, and the third gives suggestions for the background organization of bovine A.I. centres, and surveys current development in many European states and in other continents.

The book is intended not for the professional specialist worker for the

veterinary surgeons and leading agriculturists who may be concerned in the initial establishment of centres, and also for the intelligent technician. For this reason much space is devoted to basic principles of livestock improvement, normal genital physiology, elementary veterinary dietetics and building construction—the palatial bull quarters here recommended as minimum requirements being a standard desirable but not strictly necessary and surely seldom economically practicable. The section on bull behaviour is excellent, and the history of the A.I. movement in France is interestingly presented; 77,000 cows were inseminated in 1947; two centres were being run as limited liability companies for private profit; an inseminator's wage was from three to five times that of a stockman, and a measure of government control on lines broadly following those established in Great Britain was about to be instituted.

The first two sections of the book reach in the main a high level of scientific and scholarly accuracy and parts will be of value to workers in English-speaking countries as a literary digest, especially of the French original work, e.g. the collection of semen from bulls by electrical stimulation. Some repetition in the successive parts of the work is intentional and effective; the authors rightly stress the pre-eminent importance of the bovine species as the subject for practical application in their country. It is, therefore, the more curious that their description of standard methods for inseminating the cow should have been so much condensed as to lack clarity—the difference in conception rate as between intra-uterine and intra-cervical insemination is not discussed, and its significance apparently not appreciated; intra-cervical insemination with a controlling hand in the rectum is described; when a speculum is used, however, “on getting a clear view of the cervix, one introduces the end of the glass rod into the uterus”—with this bare statement the whole topic of intra-uterine insemination is dismissed, whereas its importance warrants a considerably more detailed treatment in any practical handbook. The authors' categorical assertion that vitamin

E is indispensable to normal bovine reproduction lacked justification when written and has since been largely disproved.

—F. L. M. DAWSON.

GOODE, J. S. [Translated by] [Former Lecturer in Russian, University of Melbourne], & RUDDOCK, H. B. [Edited by] [M.B., B.S., B.V.Sc. Adviser to the Commonwealth Government of Australia on Artificial Insemination of Farm Animals]. (1948.) **Artificial insemination of farm animals in the Soviet Union.** pp. 176. Sydney, London: Angus & Robertson. 42s. **2170**

This book is a direct translation of the U.S.S.R. government instruction manual for use of the staff at animal breeding stations, to which the editor has added supplementary notes here and there. The production, largely in pictorial form, is very competent, every operation having been reduced to a drill, and it has no doubt served its purpose well, that of instructing peasant types, including probably some who are illiterate, in a rough and ready technique of A.I., which has been efficient enough, however, to have revolutionized animal production in Russia. The Russian methods are those described in "Stockbreeding and the artificial insemination of livestock," by Milovanov and Sokolovskaya (reviewed in *V.B.* 19. 82) except that the numbers of cows and sows to be inseminated from an average single ejaculate have been raised to 25 and eight respectively. Again no account is given of developments subsequent to 1940, but far more detail is presented, and the methods may well have a useful practical application

in countries where stock is raised chiefly under ranching conditions. British A.I. operators could take lessons from the Russians in bull management; it seems likely that the very high rate of semen production there maintained owes something to the practice of exercising the bulls steadily for up to three hours daily in harness, furthermore the animals provide power for the cultivation of a part of their concentrate ration.

The section on transport of semen to sub-centres by carrier pigeon, dog and horse transport is interesting, and in some ways instructive. However the section on semen estimation and analysis appears to be based entirely on rule of thumb assisted by a lively imagination, and is largely out of line with the results obtained in America and Western Europe by the classical scientific method of inductive experiment. Only intra-cervical insemination is practised in bovine animals, dilution of semen though described is not generally practised, and a bull has to be kept for every 500 cows.—F. L. M. DAWSON.

BREZINA, E. (1949.) *Medizinisches Wörterbuch.* [**Medical Dictionary.**] pp. xii + 588. Vienna: Urban & Schwarzenberg. 2nd Edit. Sch.68. **2171**

This is a standard medical dictionary in the German language. Anatomical terms are very fully featured, but items of a chemical, biochemical and chemotherapeutic nature are not so well represented as many users of the dictionary would wish.

The paper, printing and binding are adequate but not luxurious.—J.E.

BOOKS RECENTLY RECEIVED

[Notice of recently received books in this list does not preclude review.]

ASHBY, E. (1949.) *Als Wissenschaftler in Russland.* [**A scientist in Russia.**] pp. 220 + 1-32 Göttingen: "Musterschmidt" KG. DM. 5.80.

BERTHELON, M. (1950.) *La chirurgie du bétail et des animaux de basse-cour.* [**Surgery in domestic animals.**] pp. 199. Paris: Vigot Frères.

BIGGER, J. W. (1949.) **Handbook of bacteriology for students and practitioners**

of medicine. pp. xv + 547. London: Baillière, Tindall & Cox. 6th Edit. 20s

BORRELLI, G. (1949.) *Chirurgia suina.* [**Surgery of the pig.**] pp. 426. Guardia-grele: A. G. Palmerio.

CLARKE, J. J. (1949.) **Introduction to public health law.** pp. 138. London: Cleaver-Hume Press Ltd. 12s. 6d.

CRAIGIE, E. H. [Revised by]. (1948.) **Bensley's practical anatomy of the**

- rabbit. An elementary laboratory textbook in mammalian anatomy.** pp. xii + 391. Toronto: University of Toronto Press. London: Geoffrey Cumberlege, Oxford University Press. 8th Edit., fully revised. 32s.
- FOSTER, J. W. (1949.) **Chemical activities of fungi.** pp. xviii + 648. New York: Academic Press Inc. \$9.50.
- GLASSER, K. (1950.) Veterinärkalender. [**Veterinary calendar.**] pp. 289. Hanover: M. & H. Schaper. DM. 7.
- GOETZE, R. (1950.) Neuzeitliche Embryotomie bei Pferd und Rind. [**Modern embryotomy in horses and cattle.**] pp. 115. Hanover: M. & H. Schaper. DM. 6.60.
- HOARE, E. D. (1949.) **The sulphonamides in general practice.** pp. 90. London: Staples Press Limited. New York: Staples Press Inc. 1st Edit. 5s.
- JEAN-BLAIN, M. (1948.) Les aliments d'origine animale destinés à l'homme. [**Animal products as human food.**] pp. 573. Paris: Vigot Frères.
- JURNY, F. (1949.) Veterinární chirurgie. [**Veterinary surgery.**] pp. 842. Brno: Studentská Organizace Čs. Veterinárních Mediků. £4 10s.
- LERCHE, M. (1949.) Die Geflügelkrankheiten. [**Diseases of poultry.**] pp. 51. Berlin: Landbau-Verlag GMBH. DM. 1.25.
- MEESSEN, H., & OLSZEWSKI, J. (1949.) Cytoarchitektonischer Atlas des Rautenhirns des Kaninchens. **A cytoarchitectonic atlas of the rhombencephalon of the rabbit.** [In German and English.] pp. 52. Basel, New York: S. Karger. Swiss fr. 50—.
- MILES, A. A. & PIRIE, N. W. [Edited by] (1949.) **The nature of the bacterial surface.** pp. vii + 179. Oxford: Blackwell Scientific Publications Ltd. 15s.
- OPPERMANN, T. (1950.) Lehrbuch der Krankheiten des Schafes. [**Textbook of diseases of the sheep.**] pp. 328. Hanover: M. & H. Schaper. 5th Edit. DM. 23—.
- PARISH, H. J. (1950.) **Notes on communicable diseases of laboratory animals.** pp. vii + 69. Edinburgh: E. & S. Livingstone Ltd. 3s.
- PETERSON, W. H., SKINNER, J. T., & STRONG, F. M. (1949.) **Elements of food biochemistry.** pp. xi + 259. London: Staples Press Ltd. New York: Staples Press Inc. 1st Edit. 21s.
- ROLFE, H. G. [Revised by] (1950.) **Bennett's materia medica and pharmacy for medical students.** pp. xxviii + 276. London: H. K. Lewis & Co. Ltd. 5th Edit. 16s.
- ROUSSY, G., LEROUX, R., & OBERLING, C. (1950.) Précis d'anatomie pathologique. [**A précis of pathology.**] pp. viii + 1338. Paris: Masson et Cie. 3rd Edit. Fr. 2800.
- SCHOENBERG, F. (1950.) Die Untersuchung von Tieren stammender Lebensmittel. [**Inspection of foodstuffs of animal origin.**] pp. 314. Hannover: M. & H. Schaper. 6th Edit. DM. 19—.
- SHAFAR, J. (1949.) **The vitamins in medical practice.** pp. 383. London: Staples Press Ltd. New York: Staples Press Inc. 1st Edit. 25s.
- STRACHEY, J. (1949.) **Three essays on the theory of sexuality.** pp. 133. London: Imago Publishing Co. 10s. 6d.
- WEYL, A. (1950.) Neue Wege zur Bekämpfung der Tuberkulose des Rindes unter Berücksichtigung der Wechselbeziehungen "Rindertuberkulose - Kindertuberkulose." [**Control of tuberculosis in cattle.**] pp. 118. Hannover: M. & H. Schaper. DM. 3.60.

INDEX VETERINARIUS

The publication of *Index Veterinarius* commenced with the indexing of the literature of 1933. It is a complete index of current publications relating to veterinary research, public health, administration, education and other aspects of veterinary science.

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TECHNICAL COMMUNICATIONS, ETC.

Commonwealth Bureau of Animal Health, Weybridge.

Review Series No. 2. Modes of spread of *Streptococcus agalactiae* infection in dairy herds. A report on co-ordinated observations by the Agricultural Research Council of the United Kingdom. May, 1944 .. 3s. 0d.

Commonwealth Bureau of Animal Nutrition, Aberdeen.

15. Minerals in pasture. Deficiencies and excesses in relation to animal health. By F. C. Russell. May, 1944 .. 5s. 0d.

16. Diet in relation to reproduction and the viability of the young. Part 1. Rats and other laboratory animals. August, 1946 .. 6s. 0d.

Commonwealth Bureau of Animal Breeding and Genetics, Edinburgh.

The semen of animals and its use for artificial insemination. By James Anderson. Spring, 1945 .. 7s. 6d.

Commonwealth Bureau of Pastures and Field Crops, Aberystwyth.

36. The grasslands of Latin America. By Miss G. M. Roseveare. Late 1946 .. 20s. 0d.

38. Advances in grassland husbandry and fodder production. Second symposium. Late 1946 .. 6s. 0d.

Commonwealth Bureau of Plant Breeding and Genetics, Cambridge.

The new genetics in the Soviet Union. By P. S. Hudson and R. H. Richens. May, 1946 .. 6s. 0d.

Commonwealth Bureau of Soil Science, Harpenden.

43. Land classification for land-use planning. June, 1946 .. 4s. 0d.

Commonwealth Mycological Institute, Kew.

An annotated bibliography of medical mycology, 1945. 1946 .. 5s. 0d.

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